AUGUST, 1954

PRODUCTS finishing

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Finishes on Metal Products

LEA newsreel

AUGUST, 195

LEA COMPOUND

Greaseless Composition for clean, effective and economical finishing on a wide variety of products.

For Polishing, Buffing, Burring, Satin Finishing; can be used on metals, plastic and wood.

CASE STUDY #1

Material: Brass.
Article: Escutcheon plates, and other builders' hardware.
Method of Forming: Wrought.
Final Finish: Imitation Butler silver.

Lea Method:

1. 120 grease set-up wheel.
2. Clean by acid dip.
3. Lea Compound Grade "N" on 10" diameter loose muslin buff 64/68 at 1800 r.p.m.
4. Nickel plate.
5. Lea Compound Grade "N" or "F" on 10" diameter loose muslin buff 64/68 at 1400 r.p.m.

Remarks: The Lea Method gave a better imitation of silver and materially lowered costs by eliminating cut-down buffing operation formerly used after the polishing step, and all cleaning and drying after final satin finishing operation.

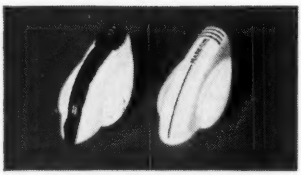
CASE STUDY #2

Material: Brass.
Article: Escutcheon plates, door handles, etc. All types of builders' hardware.
Method of Forming: Cast.
Final Finish: Brushed brass.
Lea Method:

1. 120 set-up wheel.
2. Lea Compound Grade "N" on 10" loose buff at 1500 r.p.m.
3. Lacquering.

Remarks: Lea Method eliminated the additional set-up wheel operation, cut-down buffing, cleaning and drying, and replaced the messy wet scratch brush step.

CASE STUDY #3



Material: Plastic (black Bakelite).
Article: Knife handles.
Method of Forming: Molding.
Final Finish: High lustre.
Lea Method:

1. 180 dry belt sanding to remove heavy gates.
2. Lea Compound Grade "C" on a 10" diameter 1:1 packed muslin buff at 1750 r.p.m., for the removal of the parting line, and the marks at the end from the previous belt operation.
3. Cut-down buffing with Grade 306 Black Learok on a 12" diameter loose muslin buff at 1750 r.p.m.
4. Lustre buffing with Grade 304 Black Learok on a 12" diameter loose muslin buff at 1750 r.p.m.

Remarks: Lea Compound on a packed buff is able to get in and out of finger grips on the handle and remove the parting line without any danger of burning. If a high lustre is not required, the smooth finish produced by Grade 306 Black Learok will be sufficient.

CASE STUDY #4

Material: Brass.
Article: Pocketbook ornaments.
Method of Forming: Stamped from sheet.
Final Finish: Dull gold plate.
Lea Method:

1. Lea Compound Grade "S" on side of 6" medium hard felt wheel at 3600 r.p.m.
2. Lea Compound Grade "S" on 5" cloth buff at 1200 r.p.m.
3. Gold plate.
4. Lacquering.

Remarks: The desired dull finish is produced by the Lea Method without any scratch brushing on the gold plate. The thickness of gold can therefore be decreased.

CASE STUDY #5

Material: Zinc.
Article: Automobile hardware.
Method of Forming: Die casting.
Final Finish: Bright chromium.
Lea Method:

1. 150 set-up wheel on flash.
2. Lea Compound Grade "C" on 12" sewed buff at 2500 r.p.m.
3. Copper plate.
4. Cut and color buffing with Grade 15[illegible] Learok.
5. Bright nickel plate.
6. Chromium plate.

Remarks: Flexible polishing with Lea Compound removes the irregularities in the surface left by the hard set-up wheel required to remove sharp, heavy flash. A smooth surface is produced on the zinc without lubrication, minimizing cleaning before plating.

CASE STUDY #6

Material: Zinc.
Article: Interior trim for automobiles.
Method of Forming: Die casting.
Final Finish: Brush nickel plate.

Lea Method:

1. 120 set-up wheel.
2. Lea Compound Grade "C" on 12" pocketed type buff at 1800 r.p.m.
3. Nickel plate.
4. Lea Compound Grade "F" on the same type buff at 1200 to 1500 r.p.m.

Remarks: Flexible polishing with Lea Compound is substituted for cut-down buffing plus wet scratch brushing. The final Lea Compound operation leaves the work ready for assembling without cleaning and drying.

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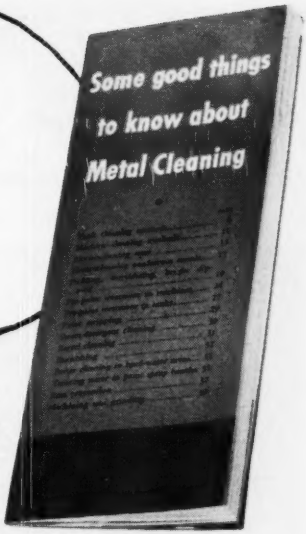

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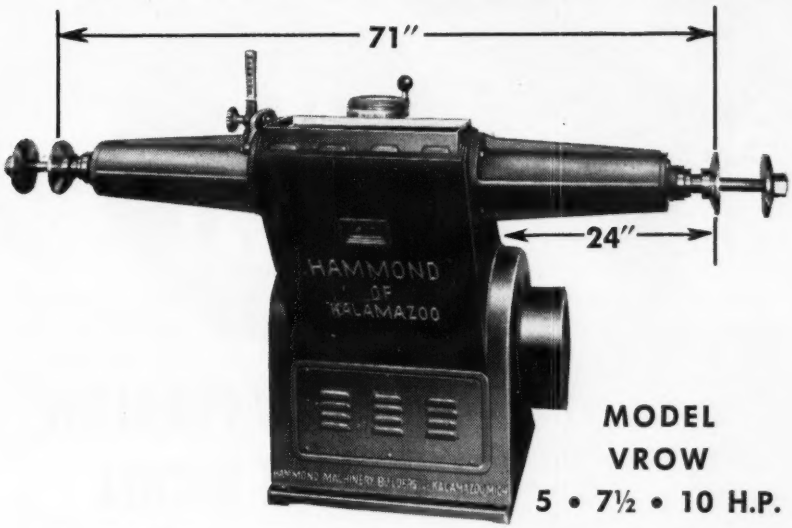

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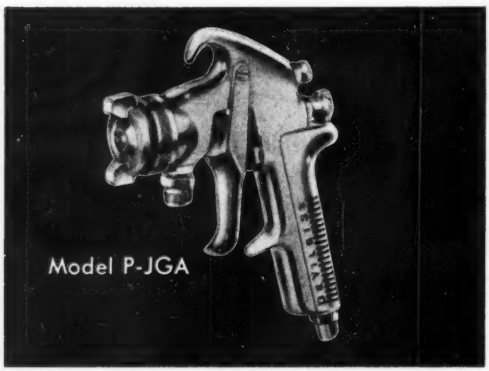

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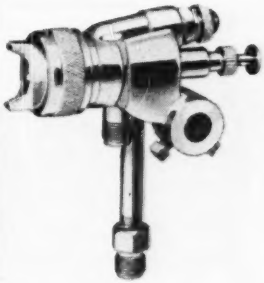

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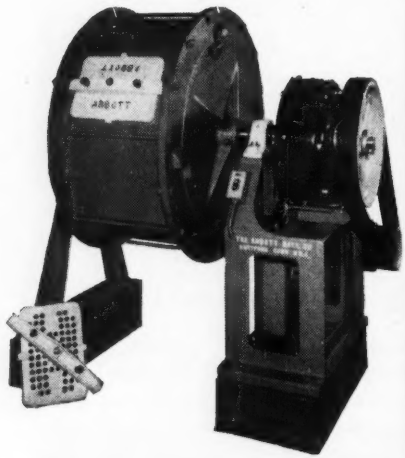

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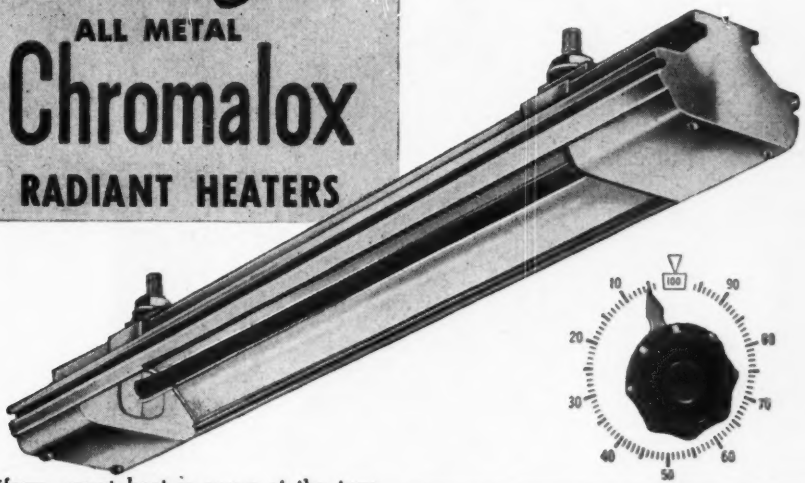

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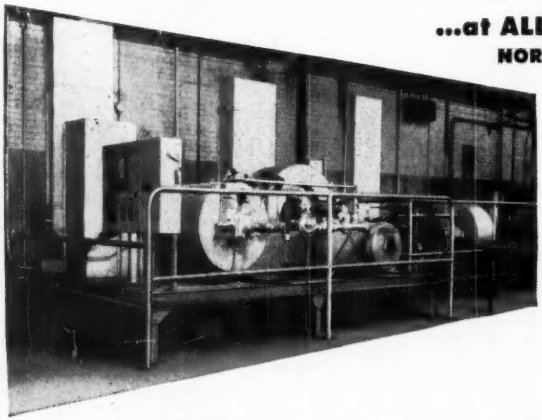

Heating systems for two batch-type varnish baking ovens are located outside of the varnish dipping department to minimize hazards.

Many Kirk & Blum Industrial Ovens are designed, fabricated and installed for specific production problems. Shown here are a few of the variety of K & B ovens which are used in electric motor manufacture at Allis-Chalmers Mfg. Company, Norwood, Ohio.

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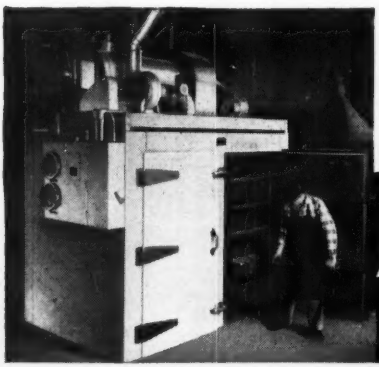

500° F. batch type core sand baking oven. Individual cores are placed on shelves at right, truck loads of cores are baked in the left hand section in new non-ferrous foundry.

KIRK AND BLUM
INDUSTRIAL OVENS

CHANDEYSSON ELECTRIC COMPANY
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how claims made can be backed up by the convincing proof of performance—now and for years to come.

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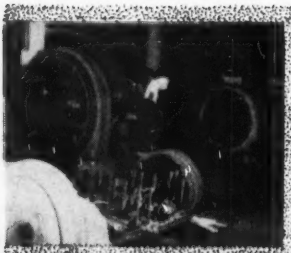
Executive Vice-President
General Manager



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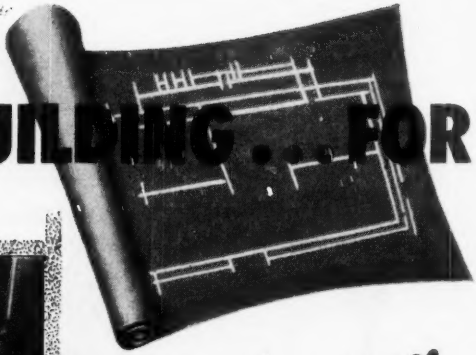

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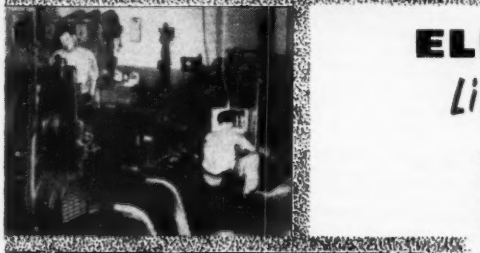

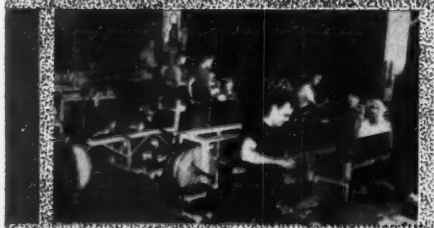

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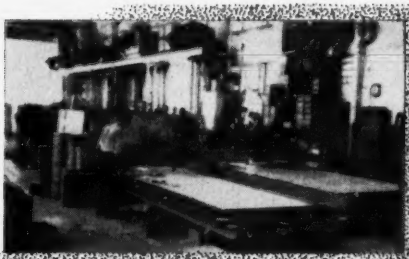

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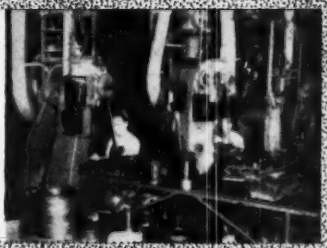

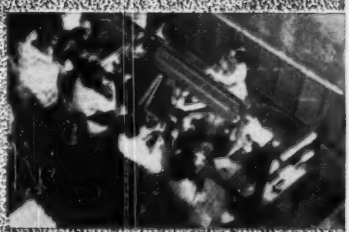

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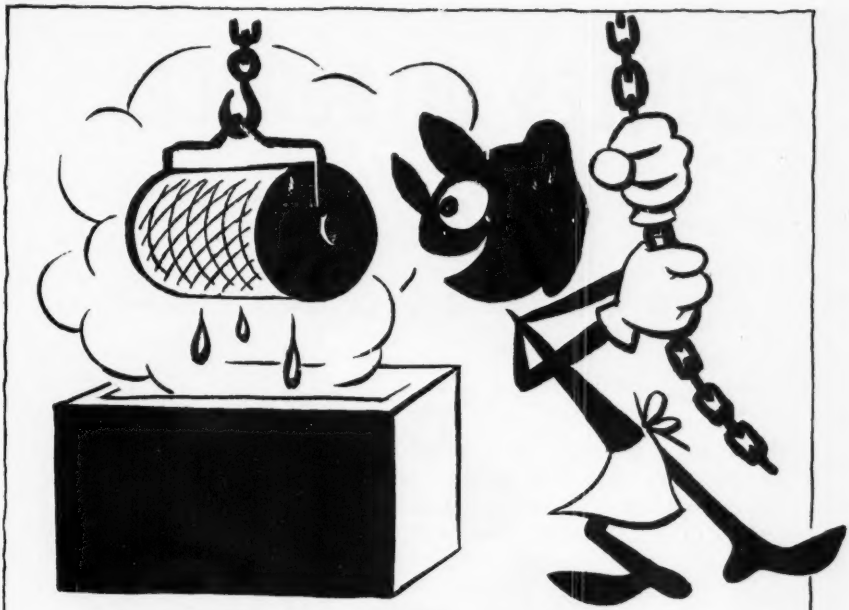

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pf editorial

Vol. 18, No. 11

AUGUST, 1954

TRENDS

Certain trends in the Finishing Industry are of interest because they demonstrate the fact that this industry is never static, but always on the threshold of new developments.

The use of color in appliance finishes is not new, having been introduced for the first time at least 30 years ago. The trend from "cold" white and chrome to "warm" colored exterior finishes is continuing. One such finish, antique copper, was described in the September, 1953 issue of PRODUCTS FINISHING. To achieve new and rich decorative effects, more appliances will be trimmed in gold and gold alloys, rather than the traditional bright chromium plate.

There is some interest at the present time in electroless nickel plating, in which a nickel-phosphorus alloy is produced without external electric current. This method may be adapted to other metals in the future.

The past few years have witnessed a gradual change from mechanical to chemical finishing methods in those cases where such changes could be made advantageously. Electropolishing and chemical polishing have been improved so that, for certain applications, these methods can be used to prepare the base metal for further finishing. In addition, there will be more emphasis on simplification of the finishing process. Such a move is always economically profitable, and today's cost competition is causing many manufacturers to simplify, and at the same time modernize, their finishing departments.

Over the past 20 years, many manufacturers have installed finishing equipment, in part because job platers were not able to produce either the quantity or quality of work desired. At the same time, many large, efficient job plating companies have been formed and have prospered by giving good service and a quality finish at a reasonable cost. At the present time job finishing associations are helping their member companies operate efficient shops and produce quality work. This situation is a healthy one, because it assures the user of plated and painted products of an attractive and durable finish.

These are only a few observations to support the firm belief that the Finishing Industry faces a "bright" future.

Ezra A. Blount

—EDITOR

Finishing Metal Surfaces

By W. B. STEPHENSON, JR.,
Chemical Engineering Subsection,
Development Department,
Aircraft Gas Turbine Division,
General Electric Company

THE short history of aircraft gas turbines or "jet engines" has given rise to some unique problems in metal finishing. Any piece of machinery that sucks in air varying from 120 to 50 deg. F. below zero fast enough to empty an average six-room house in 9 seconds, compresses it 5 to 6 times and shoots it out at blast furnace temperatures all within the length of about 10 feet is bound to raise some unique situations finishwise. We must be concerned with protecting a surface from corrosion or abrasion or both, and at temperatures and air velocities far beyond any natural element exposure.

Contrary to popular belief, the jet engine industry is not allowed to use any and all metals chosen regardless of scarcity or cost. It is limited by contract to specific weights of any metals on the strategic index. If it is desired to "fatten up" the alloy in one section, it is usually necessary to use a leaner alloy in some other section. Hence the search for leaner alloys that have the required strengths at elevated temperatures never ceases. When these alloys are found, it often becomes necessary to find methods of protecting the surface either from oxidizing during operation, or corroding during shutdown, or both. Utility is the goal with appearance secondary.

Our finishing operations can be classified under four main headings —mechanical, chemical, electrochemical, and organic. Mechanical finishing includes machining, grinding and tumbling; chemical finishing includes phosphate coating, black oxiding, dichromating of magnesium, galvanic anodizing of magnesium, descaling and pickling of steel, stainless steel, Inconel, Stellite and titanium, and preparation of aluminum for resistance welding. Electrochemical finishing includes automatic anodizing of aluminum, production copper plating for heat treat stop-off, and pilot plant and experimental plating in the laboratory of chromium, cadmium, nickel, electroless nickel, silver, rhodium, platinum, and gold. Organic finishing includes baked silicone aluminum paint, air dry aluminum paint, and baked black enamel.

Automatic Anodizing

The anodizing bath used is the chromic acid type and is, as far as we know, the first and only automatic anodizing setup in the country. Figure 2 is a diagram of the tank layout. The cleaner and rinse tanks have a working capacity of 575 gallons as does the small anodizing tank. The large anodizing tank has a capacity of 9500 gallons and will

for Aircraft Gas Turbines

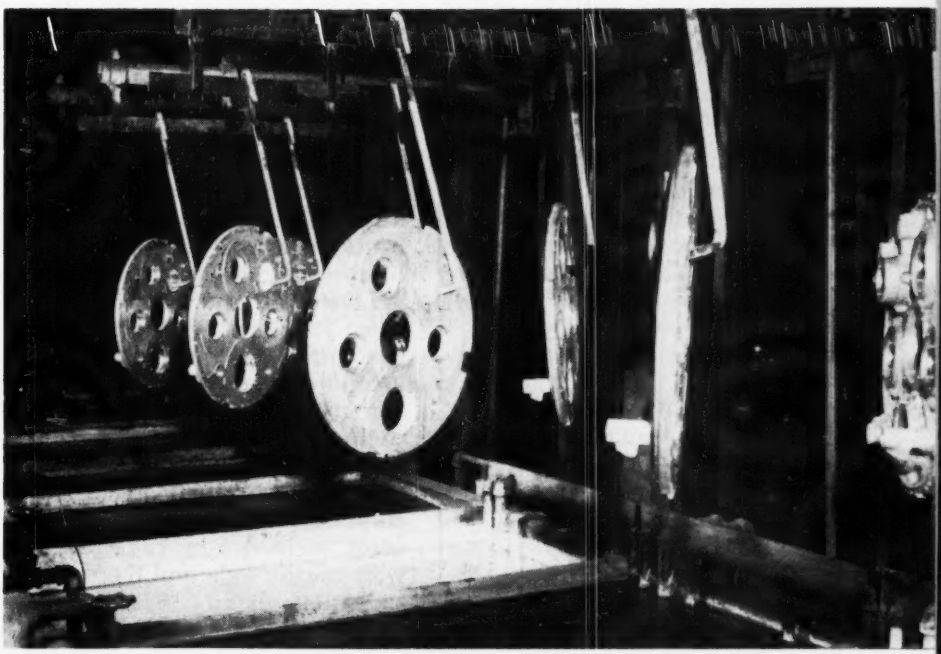


Fig. 1—Jet engine components shown racked and hooked on transfer arms of the automatic anodizing machine, and suspended above processing tanks.

accommodate 12 arms of work. The hot seal tank contains 6600 gallons. Rest time is 2 minutes and transfer time is 40 seconds. Time in the large anodizing tank is 33 minutes and in the hot seal the same length of time. Power is supplied by a bank of General Electric rectifiers with a capacity of 3000 amps at 40 volts.

Parts are racked on aluminum racks and hung on the arm at the loading station. From there they proceed, automatically, through two inhibited cleaners, and a chromic acid pickle, each followed by a rinse, and thence into the small anodizing tank. There, a light anodic film is formed by electrolyzing at 10 volts for 2 minutes. The work then goes to the main anodizing tank where it is set down at a voltage of 40 volts. There is a surge of current, but this quickly settles down to normal anodizing current. The current surge causes no difficulty, but does make careful racking mandatory. Parts must be racked firmly either by bolting or spring tension. Contact must be made on a flat surface rather than on an edge to prevent burning.

The solution used for anodizing is 5 per cent chromic acid by weight, or about 6.5 oz./gal., a very dilute solution to most platers. During anodizing, aluminum is dissolved in

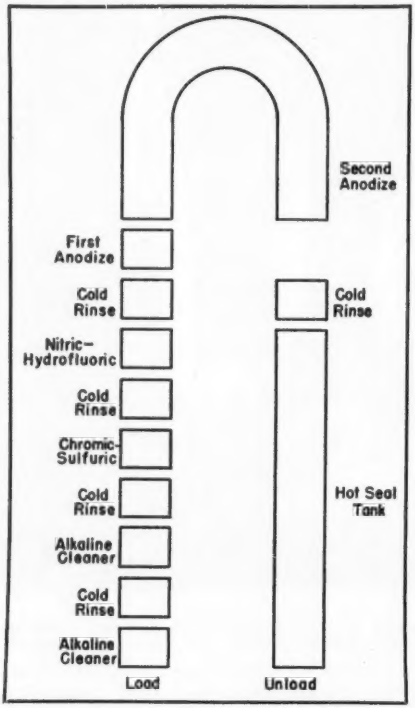


Fig. 2—A plan view of the automatic anodizing installation.

the bath and combines with the chromic acid causing the pH to rise. In the usual operating procedure chromic acid is added to lower the pH. This process is continued until the chromic acid concentration has reached 10 per cent. The bath is then operated until the pH has risen to 0.9 to 1.0 and then is partially or wholly dumped to be made anew. The excess aluminum is removed by passing the solution through a cation exchanger. We maintain our anodizing solution at a pH of 0.8 to 0.9 by passing portions of the solution through the exchanger until the pH of the entire solution is lowered to the desired point. We maintain the bath at 5 per cent chromic acid and the chromic acid additions are very low.

The overflow from the rinse tank after anodizing is connected to a neutralizing tank where caustic soda solution is added automatically by a pH controller and the pH maintained at 8.5. The neutralized solution is automatically pumped through an anion exchanger which removes the chromic acid. The effluent is pumped through a cation exchanger from whence comes deionized water which proceeds to the hot water seal. The chromic acid is removed from the anion exchanger by regeneration with caustic soda and the resultant sodium dichromate solution is pumped through the chromic acid purifying cation exchanger giving a dilute purified chromic acid to be returned to the anodizing tank or stored for future use. Make-up water for the rinse tank is obtained from an ion-exchange water softener.

Before deionizing equipment was installed it was found necessary to use sodium dichromate in the hot water seal. However, we have obtained better salt spray resistance using deionized water. Figure 1 is a general view of the automatic anodizer. Figure 3 is a view of the deionizing equipment.

Plating

Plating at the AGT plant is of two categories, — production plating of

copper for stop-off purposes during heat treatment, and pilot plant and experimental plating.

The stop-off plating is done in a 200 gallon solution of Rocheltex copper which is kept under constant filtration. Flat top ball copper anodes are used unbagged. Parts are plated 35 minutes giving a plate thickness of 0.0008 inch.

Cathode bar agitation is 15 feet per minute. After heat treating, copper is stripped in chromic acid strip (480 g/l CrO_3 - 100 g/l H_2SO_4). Figure 4 shows a general view of the plating department. Gear teeth and hubs of gears requiring hardening are masked with formed rubber masks during plating.

Some electroless nickel has been done on a production scale but owing to a change in design on our newer engines the necessity for running this type of plating in our plant no longer exists and the tanks are being converted to other urgently needed uses.

The laboratory pilot plating line has facilities for electrocleaning, pickling, nickel plating, chromium plating, and cadmium plating with the necessary rinses. The tanks are 80 and 110 gallon. Power source is a 0 to 40 volt rectifier with stepless control. Maximum amperage is 225 amperes. All electrified tanks are equipped with ammeters, voltmeters and reversing switches so that the work rod may be made either cathodic or anodic. All switches, controls and instruments are on a central control board.

The laboratory plates experimental and development parts for the various engineering groups in the plant. We also do emergency plating jobs for production and maintenance. Parts plated vary from finger-

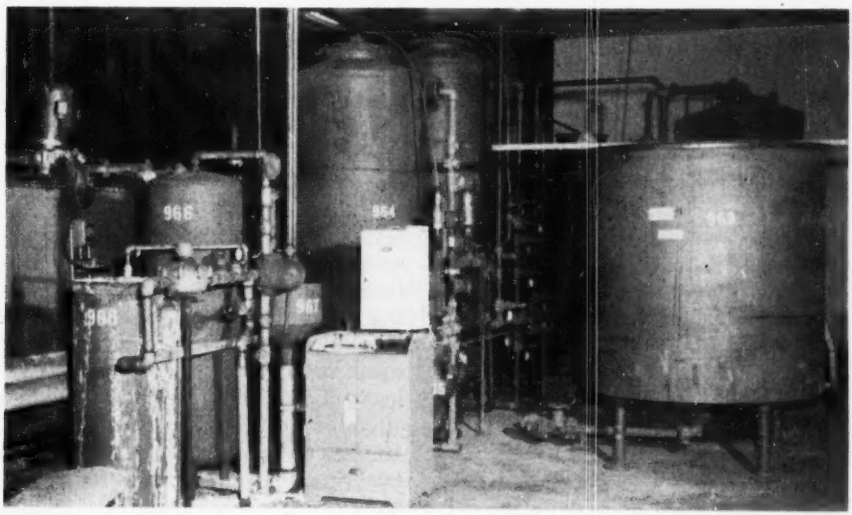


Fig. 3—A view showing some of the deionizing equipment used in connection with automatic chromic acid anodizing of jet engine components.

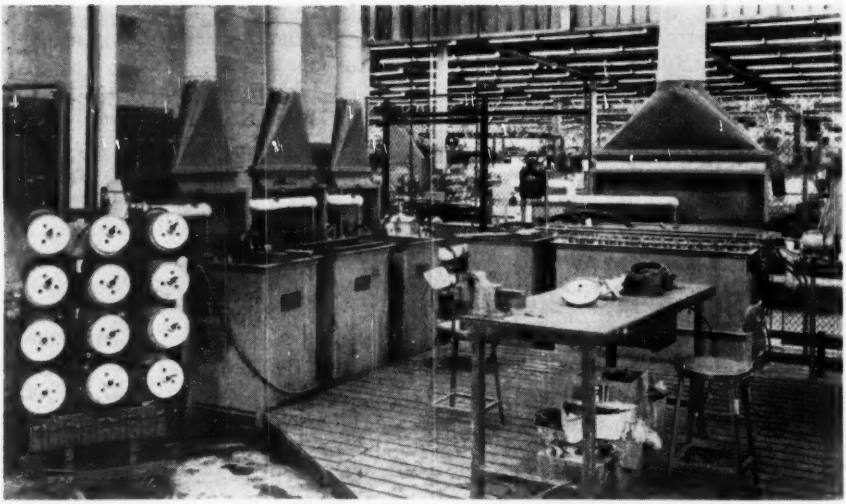


Fig. 4—A general view of the copper plating installation.
(Illustrations courtesy Aircraft Gas Turbine Division, General Electric Company, Cincinnati, Ohio)

nail size to over 100 pounds. The base metals we are requested to plate on are, to put it mildly, a plater's nightmare. Most platers have a distinct aversion to plating the 300 and 400 series of stainless steels. The 400 series we have plated many times with nickel and nickel-rhodium. The 300 series is more often silver plated. This sometimes is just the jumping off place for us. Not long ago we were requested to silver plate a material called S-816, consisting mainly of the following elements: Chromium, 20; nickel, 20; cobalt, 44; molybdenum, 4; tungsten, 4; columbium (niobium), 4; and iron, 3 per cent. That is a plating job at best, but we were offered the added inducement that the plating must stand 1000 deg. F. This was successfully accomplished.

You may rightly ask why we would wish to plate some of these metals that are obviously corrosion resistant in themselves. In the case of the stainless steels most of the plating is done on bolts. The stainless steels are notorious in their ability to seize after exposure to high temperature. To prevent wringing off of the bolt heads on disassembly the bolts and nuts must be plated. Silver plating has been found to be quite helpful in this case. Laboratory tests have shown that even better results can be obtained in using a different plate on the nut and bolt. Using a silver plated nut it was found that nickel plate with a flash of rhodium or platinum gave the best release characteristics. Nickel against silver is only slightly less effective. In the case of the S-816, this was an experiment in the reflection and dissipation of excess heat in a highly oxidizing atmosphere.

Our chromium plating is done

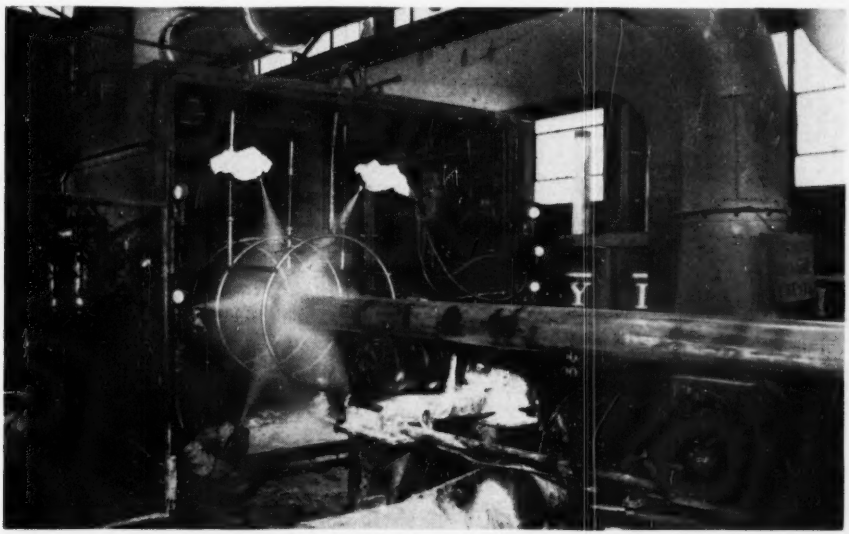
mainly on selective areas for abrasion resistance or build-up of surfaces. Some areas have been built up as much as 0.050 inch without spalling or cracking.

Cadmium is confined to brackets, bolts and other parts not exposed to oil or temperatures over 500 deg. F.

Gold plating is of very small volume confined mainly to contacts for our instrument laboratory.

Adapted for publication in PRODUCTS FINISHING *from a paper presented before the Cincinnati Branch, American Electroplaters' Society.*

Ruthenium, a precious metal of the platinum group, takes its name from the Latin word Ruthenia, meaning Russia, the country where it was first isolated as a separate element in 1845.



THIS electronic spray painting line, at the Ambridge, Pa., plant of the Spang-Chalfant Division, The National Supply Co., is believed to be one of the fastest in the United States.

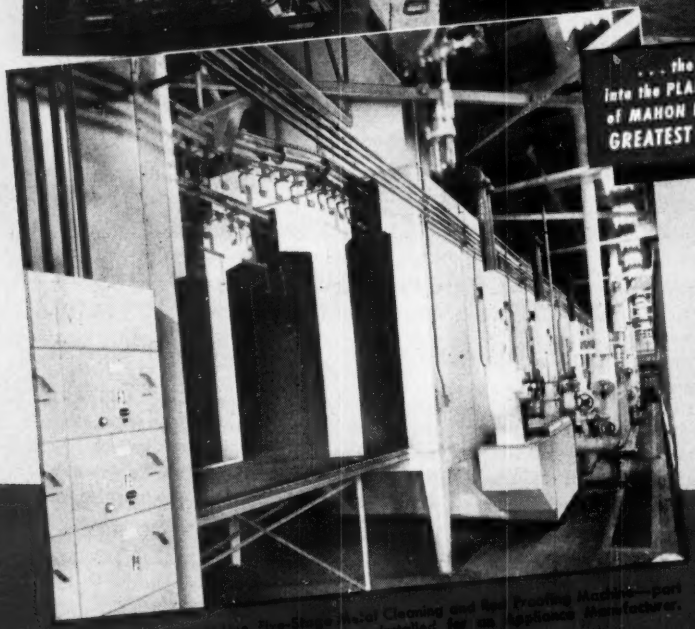
Seamless steel pipe, in sizes from 2⅜ to 9⅝ inch O. D., are sprayed at a speed of about 500 feet per minute.

Four circular electrodes and six guns are arranged around the conveyor line. The guns open automatically when the leading end of each length arrives at the spray station and close when the tail end has passed through.

Pressure tanks with piping, an Ashdee 100,000 volt transformer-rectifier, automatic triggering, and other control equipment is at the left of the especially designed booth shown in the picture.

(Photo courtesy National Supply Company)

COMPLET



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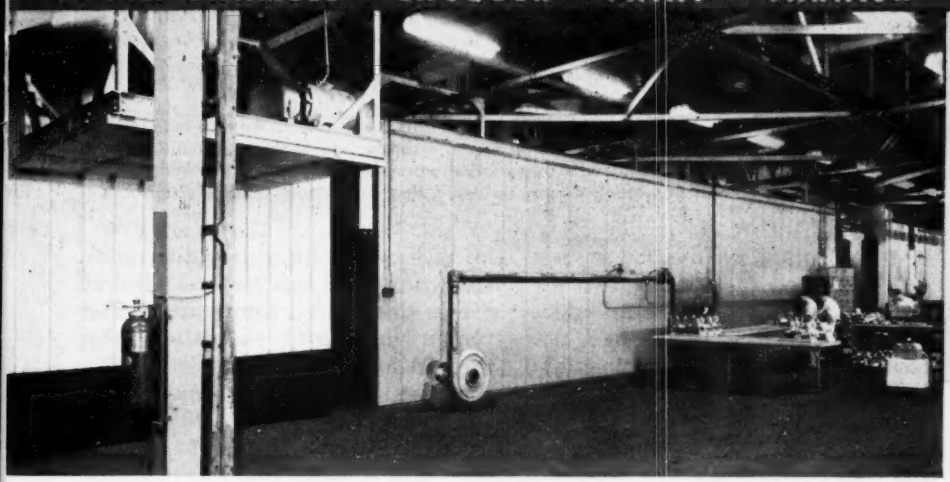

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AHON

A Review of Cleanliness Tests

By JAY C. HARRIS
Chemical Research Department
Research and Engineering Division
Monsanto Chemical Company

Recent data on sensitivity of metal cleanliness tests are discussed. An increased sensitivity radiotracer method is described, and a comparison of the sensitivities of several methods is provided. A compilation was made of the many methods used for cleanliness, indicating the principle of action and original reference.

AN evaluation method is comprised of at least two elements of maximum importance; the standardized procedure or cleaning operation, and the method for measurement of results. In metal cleaning there has been no dearth of methods, while the procedure for measurement probably has received even greater emphasis. The elements of a good method are sensitivity and reproducibility, correlation with practice, and ease (or simplicity) of operation. These last two are very important to the person who would apply the method for either control purposes, or to a quick evaluation to aid production decisions.

A survey of the literature[1] reveals that perhaps less research attention has been paid to the procedure for laboratory cleaning evaluation, than to a procedure for estimating the degree of cleanliness attained, though neither has been slighted. There may be good reason for this, since a sensitive, quantitative method is indicated. Extreme refinement of technic probably is not necessary for production control, provided the method chosen yields the desired information. For proper laboratory evaluation, the method for measurement should be sensitive, reproducible, and quantitative.

Within the last three years, only one new cleanliness evaluation technic has appeared. That is the kerosene viewer method of Holman, Clark and McMenamy, presented at the March 1954 meeting of ASTM D-12. This method may have considerable interest as a control test because of its simplicity.

Much recent research has been directed toward development of a sensitive, quantitative method for estimating the results of the cleaning procedure. Since chemisorption, approaching monomolecular film dimensions, can be the cause for plating failures it can be seen that a sensitive research tool is indicated. Two methods have recently been rather exhaustively explored; the radiotracer technic[2], and the atomizer test[3].

Improvement in sensitivity of

Table I

AVERAGE TEST SENSITIVITY (a)

Surfaces—matte and polished

Contaminants—fatty acids, fatty esters, medium and paraffinic oils

Test	Average Sensitivity gm./sq. cm.	Relative Sensitivity
Waterbreak (spray pattern)	1×10^{-6}	10
Atomizer	8×10^{-8}	800
Fluorescent Dye	1×10^{-5} (2×10^{-7})*	1
Radiotracer	1.7×10^{-7} (1.7×10^{-9})*	170 (1700)*
Potassium Ferricyanide	6×10^{-5}	6
Copper Sulfate Dip	9×10^{-6}	90

* Tracer alone

(a) H. B. Linford and E. B. Saubestre, "Cleaning and Preparation of Metals for Electroplating, VIII," Plating, Vol. 40, pp. 1269-1271 (1953).

method frequently results from refinement of technic, and this is as true for the atomizer test as for the radiotracer method. An extremely sensitive method may have little or no control application, but can prove of inestimable value in the evaluation of other, perhaps more industrially practicable methods. Both the atomizer and the radiotracer tests have been successfully used for this purpose.

Linford and Saubestre[4] using their atomizer test developed the information listed in Table I.

Rice[6] applied known amounts of an oily soil to precleaned surfaces, then applied several cleanliness evaluation methods. The results of his evaluation are shown in Table III, as applicable to the methods described.

Radiotracer Method

Our own use of the radiotracer method has followed the usual pattern of sensitivity improvement, both through technic and equipment sensitivity. Our original work involved the Geiger-Muller tube and advanced through an improve-

Table II

AVERAGE TEST SENSITIVITY RADIOACTIVE TRACER METHOD

Test	Average Sensitivity gm./sq. cm.	Relative Sensitivity
Fluorescent Dye	$2.2\text{-}2.6 \times 10^{-5}$*	1
Copper Plate	$6.0\text{-}7.0 \times 10^{-6}$	4
Water Break	$2.4\text{-}9.9 \times 10^{-7}$	24-100
Atomizer Spray Test	$2.4\text{-}26.0 \times 10^{-7}$	9-100
Radiotracer	$0.1\text{-}2.0 \times 10^{-8}$	1800

Table III

COMPILATION OF CLEANLINESS TESTS

1. Water-Break.
   Receding contact angle by visual observation.
   No differentiation between clean panels and those soiled with 0.01% oil (Rice).

2. Gravimetric Test.
   Panel cleaned, weighed gravimetrically, solvent degreased and reweighed.
   Sensitivity restricted by balance, but usually 5×10^{-5} g. with a very sensitive balance.

3. Ferricyanide Paper.
   Suitable paper immersed in solution of NaCl, $K_3Fe(CN)_6$, $K_4Fe(CN)_6$ in water, and dried. Moist paper placed in contact with metal and after removal rinsed in clear water, soiled spots provided clear areas. Measurement of areas can be used to provide cleaning index.
   W. H. Walker, J. Am. Chem. Soc., Vol. 29, p. 1256 (1907)
   D. J. MacNaughtan, Trans. Faraday Soc., Vol. 26, pp. 465-481 (1930)

4. Mears' Test—Elm's Modification
   Single drops of 32 ml./l. of 30% H_2O_2 placed on areas by medicine dropper and time required for first corrosion measured.
   Tests did not indicate differences between soiled and unsoiled panels.
   R. B. Mears and U. R. Evans, "The Probability of Corrosion," Trans. Faraday Soc., Vol. 31, Part I, pp. 527-542 (1935)
   H. A. Nelson, see Rice

5. Tissue Paper Wiping Test.
   Surface wiped with white tissue paper. Oil or solid soil apparent on paper, sensitivity not known.
   L. Zakarias, Chimie et Industrie, Vol. 36, pp. 1095-1100 (1936)

6. Contact Angle Test.
   Measurement of contact angle or angle of incidence measured by reflecting beam of light into droplet and measuring angle of the beam deflected from the droplet.
   Detect oil at 0.01% on panels (Rice).
   I. Langmuir and V. J. Schaefer, Chem. Reviews, Vol. 24, pp. 181-202 (1939)

7. Fluorescent Dye.
   Incorporation of oil-soluble fluorescent dye in oily soil. Retention soil observed under UV light.
   Not sensitive to 0.1% oil soiled panel (Rice).
   O. M. Morgan and J. G. Lankler, Ind. Eng. Chem., An. Ed., Vol. 14, pp. 725-726 (1942)

ment in the radiotracer compound, to the use of the more sensitive Q-Gas counting chamber. These changes resulted in sensitivity increases by a factor of from 10 to 20.

The data of Table II were obtained using C^{14} tagged N,N-'di-n-butyl stearamide in SAE 60 lube oil, as in our previous work[2], in which the same cleaning technic was used. Ranges of relative sensitivity are given because of the variation in counts obtained, attributable in part to the small size of our metal sample pans, and the difficulty in applying certain of the methods to them. The following data should be compared with those

Table III

COMPILATION OF CLEANLINESS TESTS

8. Oil Spot Test.
   Areas degreased and droplet of degreasing solvent evaporated on ground glass. Evaporation ring evidence of oil. 5×10^{-3} said to be limit of test.
   A. Edeler, Ind. Eng. Chem., An. Ed., Vol. 15, p. 282 (1943)
9. Spray Pattern.
   Test pieces are sprayed with water, and the soiled areas show droplet formation. These areas are sized and comparsions made of the areas still soiled.
   Receding contact angle.
   S. Spring, H. I. Forman and L. F. Peale, Ind. Eng. Chem., An. Ed., Vol. 18, No. 3, pp. 201-204 (1946)
10. Copper Dip.
    The rinsed test panel is dipped in an acid copper sulfate solution. Cleanliness ascertained by continuity and adherence of plate.
    G. B. Hogaboom, Proceedings, Am. Electroplaters' Soc., Vol. 35, pp. 215-221 (1948)
11. Radioactive Tracer.
    Estimation of cleanliness based upon retained tracer compound.
    J. C. Harris, R. E. Kamp and W. H. Yanko, ASTM Bulletin, No. 158, p. 49 (1949)
12. Rock Island Drop Test.
    Measurement of diameter of distilled water droplets from given height allowed to fall on panel surface.
    Distinguishes between clean panel and one soiled with 0.01% oil solution.
    T. Rice, ASTM Bulletin, No. 178, pp. 50-58 (1951)
13. Ring Test.
    Drop water formed on ring of surface tension tester, then ring lowered to touch test surface. Process of repeatedly touching surface continued until all the water transferred, and number of contacts, called B-number, used as a measure of wettability.
    K. Schultze, Kolloid Ztg., Vol. 121, pp. 57-65; Vol. 122, pp. 43-50 (1951)
14. Atomizer Test.
    Cleaned panels are dried under specific conditions then sprayed with water containing a dye. When the pattern has developed, the panels are dried under infrared. A planimeter is used to measure the surfaces still soiled.
    Advancing contact angle with no "bridging" of droplets.
    H. B. Linford and E. B. Saubestre, Plating, Vol. 38, No. 8, pp. 847-855 (1951)
15. Kerosene Viewing of Water-Break.
    Wetted panel dipped in container of kerosene lighted from bottom.
    Near water-breaks are displaced by kerosene giving sensitivity better than usual water-break and said to be equal to, or better than atomizer test.
    E. R. Holman, F. E. Clark and R. H. McMenamy—Comm. 4/10/53

of Table II to demonstrate the effect of a more sensitive test method[6].

Fluorescent dye	1
Copper plate	4
Water break	11
Radiotracer	110

For the sake of convenience, the several methods for detecting cleanliness have been collected in a single table (Table III), indicating the principle of the method, sensitivity where pertinent, and the original literature reference.

ACKNOWLEDGMENT

I am indebted to Miss Mary Rose Sullivan who performed the laboratory work from which the new sensitivity data were developed.

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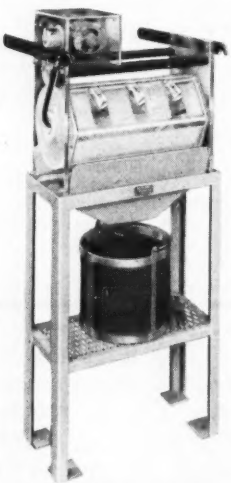
5. Rice, T., ASTM Bulletin, No. 178, pp. 50-58 (1951).
6. Harris, J. C., R. E. Kamp and W. H. Yanko, J. Electrochemical Soc., Vol. 97, No. 12, pp. 430-432 (1950).

Adapted for publication in PRODUCTS FINISHING from a talk delivered at the 42nd Annual Educational Session, Chicago Branch, American Electroplaters' Society.

Good Painting Practice. The first of two volumes of the **"Steel Structures Painting Manual."** Published by the Steel Structures Painting Council, available through the Federation of Paint and Varnish Production Clubs, 121 South Broad St., Philadelphia 7, Pa. Edited by Dr. Joseph Bigos, Senior Fellow, Mellon Institute. 432 pages, 8½ by 11. Case bound in leatherette with hard covers. $6.00 postage prepaid.

"Good Painting Practice" describes the best of the current surface preparation and painting practices in various industries. It is written from the viewpoint of paint users. It is a practical encyclopedia of economical and satisfactory painting methods, rather than a technical treatise on paint formulation. The book contains 18 chapters plus a foreword, glossary and index.

Subjects of some of the chapters are: Simplified Theory of Corrosion, Mechanical Surface preparation, Chemical Surface Preparation, Quality Control of Paints, Painting of Steel Tanks, Protection of Pipelines and Other Underground Structures, Painting of Industrial Plants, Metallizing, and Causes and Prevention of Paint Failure.



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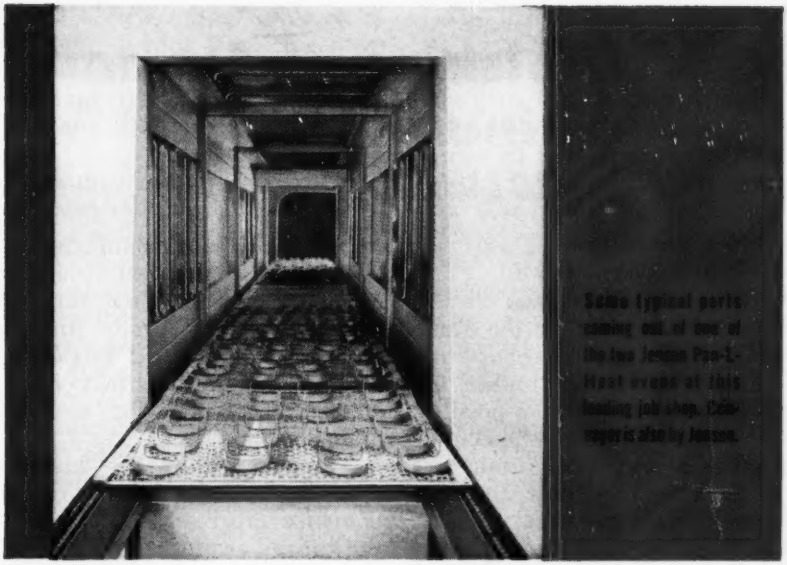

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Surface Finishing of Alumaroll Aluminum Awnings

By J. E. ORCHARD
President, Orchard Brothers, Incorporated

A New Kind of Awning That Rolls Up and Down

THE history of awnings reaches far into the past. In the Stone Age, cave owners probably found relaxation under the shade of trees. These were possibly history's first awnings—and pretty good ones, too. Then around 50 B. C. men became wiser and had the tree brought to them. Cleopatra's admirers were shaded by palm leaves, mounted on flesh and blood motors. Five hundred years later, man decided to manufacture his own shade. So the next awning was a canopy that shut out sun, rain, and evil spirits. Finally American pioneers went a step further and built window shutters that could be closed to keep out wind, snow, and animals.

Awnings within the last fifty years have shown the sure rapidity of man's progress. First there was the canvas awning as we recognize it today. Later, rigid steel awnings appeared on the market. Then back

Fig. 1—Original ALUMAROLL awning installation at Macy's in New York City. The awning is almost 20 years old and still in good working condition.

in 1935 a new roll-up commercial aluminum awning for downtown stores was introduced and met with immediate acceptance.

Orchard Brothers Incorporated is one of the pioneer aluminum awning manufacturers. Its awnings, sold under the trade name of ALUMAROLL, consist of a series of interlocking "slats" which are beaded on the edges in reverse directions. This patented construction permits an ALUMAROLL home awning to roll up and roll down by means of a set of front springs encased in extruded aluminum tubing. All lowering and raising operations can be controlled from inside the house.

From this same beaded slat, in addition to the roll-up home awnings, stationary door canopies, mobile terrace covers that may be rolled up against the house for the winter months, and commercial stationary and roll-up awnings are made. The beaded slat is also used to make a building product called a Roll-Up Kitchenette Door which meets the specific need for a compact door for kitchenettes and closet closures in apartments and small homes.

●

The first ALUMAROLL awning was installed on Macy's New York store in 1935 (it's still there as shown in Fig. 1) and in 1945 Orchard Brothers Incorporated was started to take over ALUMAROLL and its seven people. Today, with over 100 employees, including the original seven, it is the largest national manufacturer of aluminum awnings and the only one that makes a roll-up awning available for private homes. It has grown into an international organization covering every state in the union and throughout a good part of the free world. Canada is now completely franchised, and this year will see assembly plants in at least 30 countries in Europe, Asia, South America, Central America, Africa, Puerto Rico, and the West Indies.

Finishing Techniques

Early in ALUMAROLL history, company executives realized that some kind of special metal surface treatment would be necessary in order to obtain adherent weather-re-

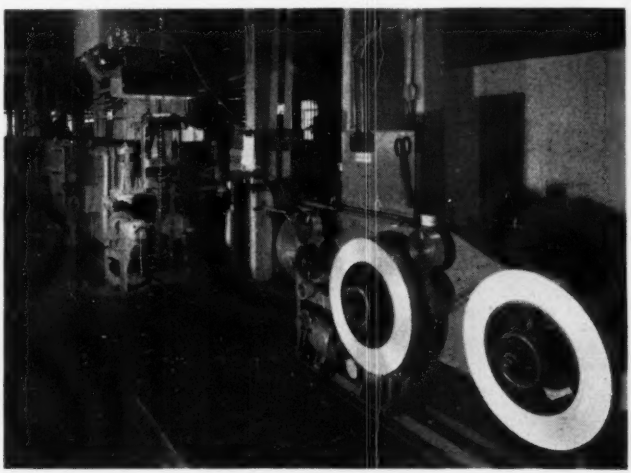


Fig. 2—Continuous strip Alodizing machine at Orchard Brothers, Inc., Rutherford, N. J. The photo shows the Alodized aluminum strip leaving the processing equipment and being wound on the reel in the foreground.

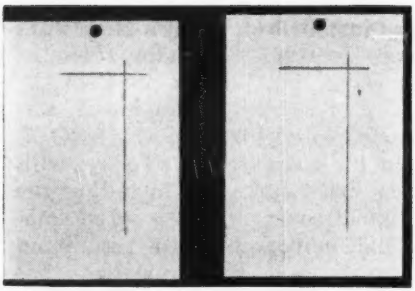


Fig. 3—After 1000 hours of salt spray exposure the paint finish on aluminum panels treated with "Alodine" No. 1200 is unaffected.

sistant enamel coatings on aluminum awnings.

In 1946 the first continuous Alodizing* and roller painting machine for aluminum strip was installed. In this continuous strip process the pre-paint cycle included cleaning, water rinsing, Alodizing with "Alodine" No. 100 (which was a combination of a five second "Alodine" dip followed by a 15 second "Alodine" spray), water rinsing, and "Deoxylyte" — acidulated rinsing. The line speed ranged from 60 to 72 feet per minute.

Since October 1946 improvements have been made and the machine has been constantly refined for even greater quantity and higher quality products (Fig. 2). For example, because of the different soils present on strip supplied by various aluminum companies, it was necessary to change the cleaner from a mild acidic type to a "Ridoline" buffered alkali fortified with "Ridosol" emulsion cleaner. An even more advantageous improvement was the change from American Chemical

*"Alodine" Trade Mark Reg. U. S. Pat. Off. by the American Chemical Paint Co. for chemicals for coating aluminum.

Fig. 4—The aluminum strip from which ALUMAROLL awnings are made, is painted in a continuous roller-coater process. The bond provided by the conversion coating enables the painted strip to withstand all forming operations without damage.

Fig. 5—Tyoical ALUMAROLL awning installation on a private residence.

Paint Company's "Alodine" No. 100 to "Alodine" No. 1200. This recently developed surface conversion coating for aluminum bonds paint just as durably as other grades of "Alodine" and makes the aluminum even more corrosion-resistant (Fig. 3). And, like its predecessor, "Alodine" No. 1200 sets up a bond for paint so durable and so tenacious that the aluminum awning slats can be roll-formed after the paint finish has dried, without any damage, even superficial, to its lustrous surface.

At the present time the Alodizing process at Orchard Brothers consists of the following stages:

1. "Ridoline-Ridosol" alkali-emulsion cleaning.
2. Clean flowing water rinsing.
3. "Alodine" No. 1200 protective

Fig. 6—A new application of ALUMAROLL awnings is known as ALUMAGROVE. This type of terrace cover serves the special purpose of protecting a patio when there is inadequate room for installation on the side of a house or when the patio is not near a building.
(Photographs courtesy American Chemical Paint Co., Ambler, Pa.)

conversion coating.

4. Clean flowing water rinsing.
5. Final "Alodine" No. 1200 acidulated rinsing.

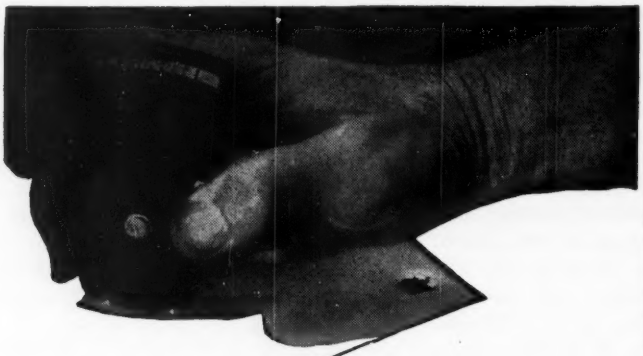
The aluminum strip is then dried and painted (Fig. 4).

Conclusion

ALUMAROLL aluminum awnings combine the advantages of canvas and rigid metal awnings into one awning that gives the home owner everything he wants. ALUMAROLL awnings, door canopies, and mobile patio covers program a house for climate control and give 100 per cent climate control for the first time in awning history. They shut out the sun when the home owner wants it shut out; they allow it to come in when he wants it to come in; they keep snow off his doorstep, and sleet off his windowpanes — winter or summer, with ALUMAROLL, sun, snow, rain, and sleet control are his at a finger touch from inside the house (Fig. 5).

And the "inside" story is just as impressive. These mobile aluminum awnings aid interior temperature control, take a load off air conditioning units by eliminating direct sun heat, and prevent home furnishings from being faded by the sun.

They come in a variety of brilliant baked enamel colors which can be used plain or in striking



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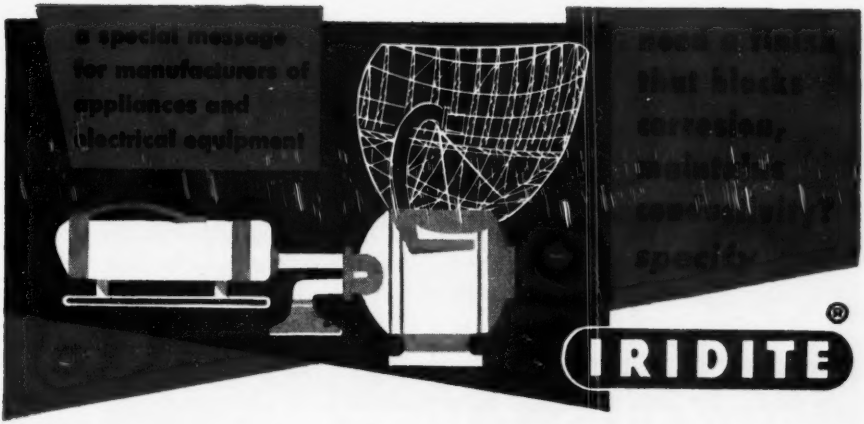

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stripes to suit every taste. And most pleasing of all, the underneath section is as attractive as the top. No nuts or bolts show, and, if desired, the underneath color can be a softer pastel to blend with interior furnishings of the home and subdue inside light.

Door canopies to beautify and protect entrances to the home and roll-up patio covers to make for more comfortable outdoor living complete the climate control picture (Fig. 6).

Important, too, is the high corrosion-resistance and durable paint adhesion that "Alodine" No. 1200 imparts to the aluminum slats and all other components made of Alodized aluminum. The fact that ALUMAROLL awnings are given a protective Alodizing treatment before application of the final paint finish means that the severe beatings from the weather will not damage either paint or metal.

Complete information about how manually - operator portable and panel indicators are being used to measure temperature, electrolytic conductivity or pH is contained a 23-page catalog, **"L&N MANUALLY-OPERATED INDICATORS FOR TEMPERATURE, ELECTROLYTIC CONDUCTIVITY AND pH MEASUREMENTS,"** available from **Leeds & Northrup Company**, 4934 Stenton Ave., Philadelphia 44, Pennsylvania.

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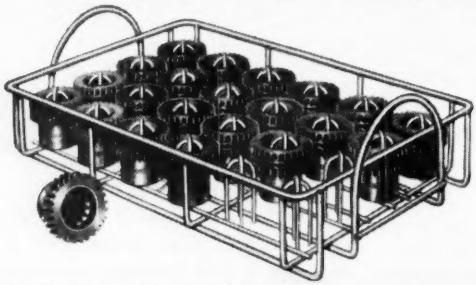

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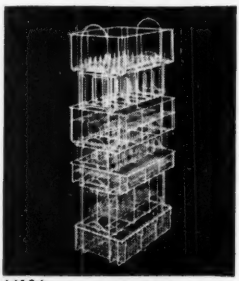

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Fig. 1—(Above) Sunday, July 11, found the Directors of the Metal Finishing Suppliers' Association, Inc., hard at work planning for Monday's activities sponsored by that organization. Shown (left to right) are C. L. Berry, T. A. Trumbour, Manson Glover, A. P. Munning, R. J. Hazucha, R. F. Ledford, H. J. Struckhoff, A. N. Braun, W. D. MacDermid.

Fig. 2—A view taken at the meeting of the Board of Directors of the National Association of Metal Finishers. W. F. Walton, Walton & Lonsbury, is the new president of the NAMF.

People and Events at The 41st A.E.S. Convention

Reported by EZRA A. BLOUNT

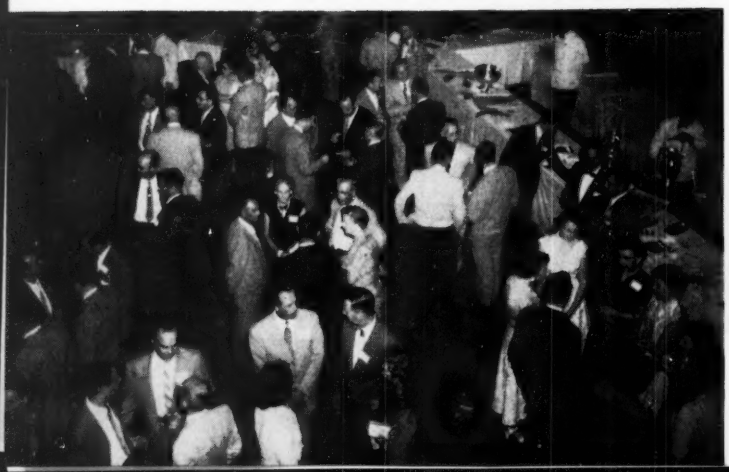


Fig. 3—(Left) The Get-Together Party to greet early comers held Sunday evening was well attended. There were some 700 registrations by 8:00 P.M. Sunday.

Fig. 4—(Left) George Schore, Convention Chairman, opened the 41st A.E.S. Annual Convention. Shown at Mr. Schore's right are Senator Wayne Morse who presented an address on "The Foreign Policy of the United States"; Dr. George P. Swift, A.E.S. President; P. Peter Kovatis, A.E.S. Executive Secretary.

Fig. 5—(Above) A view of the Speakers' Table at the Annual Luncheon and Meeting of the Metal Finishing Suppliers' Association, Inc.

Fig. 6—(Right) A partial view of the members and guests in attendance at the Metal Finishing Suppliers' Association Annual Luncheon.

Fig. 7—(Right) All Convention registrants were guests of the Metal Finishing Suppliers' Assn., Inc., at the Annual Open House which has been an important feature of A.E.S. Conventions for many years.

Fig. 8—The Past Presidents of the American Electroplaters' Society and their ladies were guests of the New York Branch at a Dinner held in their honor. Shown (seated, left to right) Rev. Frank C. Mesle, H. A. Gilbertson, Frederick Fulforth, George Wagner. Standing (left to right) are C. F. Nixon, W. L. Pinner, Wm. J. Neill, K. M. Huston, A. W. Logozzo, S. S. Johnston, Dr. George P. Swift, E. T. Candee, M. R. Caldwell, Franklyn J. MacStoker. Mr. Nixon is the newly elected Chairman of the Order of Past Presidents.

Fig. 9—A special breakfast for Alumni of Michigan State College present at the Convention was held. Shown (left to right) are C. Fred Gurnham, Mrs. Richard L. Nyquist, Richard L. Nyquist, Wm. Springer, W. J. Erskine, B. C. Case, A. D. Squitero, Dr. D. T. Ewing, A. H. DuRose, Harold Leever, Mrs. Harold Leever, M. R. Caldwell, Bruce E. Warner, Wm. M. King. Francis X. Bergin, Wm. D. Gordon.

Fig. 10—One of the speakers at the Second Management Seminar conducted by the National Federation of Metal Finishers was Silvio C. Taormina, Executive Secretary, Masters' Electro-Platers Assn., who chose as his topic, "A Look Into the Future of the Job Shop Plating Industry." Mr. Taormina predicted a bright future for the job plating industry. Shown with Mr. Taormina are Frank Kaiser, who served as Chairman of the meeting; and Sam Ratoff, who introduced the speaker.

Fig. 11—At the Banquet held by the National Federation of Metal Finishers, J. Frederick Benedict, Regional Director for New York of the Small Business Administration, addressed the job platers on the topic, "How the Government Helps Small Business."

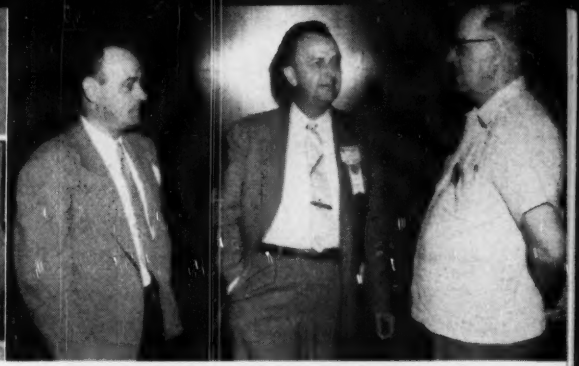


Fig. 12—(Above, left) Gene Combs, Diamond Alkali Co., was most active during the entire Convention promoting the 1955 A.E.S. Convention and Industrial Finishing Exposition to be held in Cleveland. Mr. Coombs is General Chairman of the 1955 Convention Committee. Shown with Mr. Combs is Mr. Roemer, also of Diamond Alkali Co.

Fig. 13—(Above, right) Three men long active in A.E.S. affairs comprise this group. (Left to right) Dr. M. M. Beckwith, Harshaw Chemical Co.; C. F. Nixon, General Motors Research Corp.; and H. E. Head, Briggs Mfg. Co. Dr. Beckwith was recently elected 3rd Vice President of the Metal Finishing Suppliers' Assn., Inc. Mr. Nixon, an A.E.S. Past President, is now serving as Chairman of the Order of Past Presidents. Mr. Head has been quite active making plans for the 1959 A.E.S. Convention and Industrial Finishing Exposition.

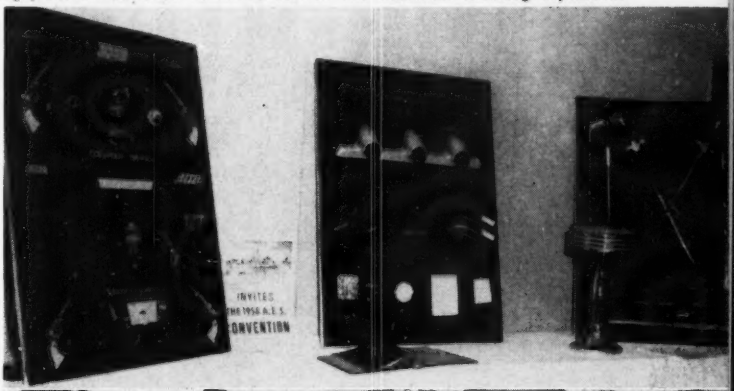


Fig. 14—For the third time, the First Prize for Branch Exhibits was won by the Columbus Branch. Second Prize was awarded to the Newark Branch exhibit and Third Prize to the Chicago Branch.

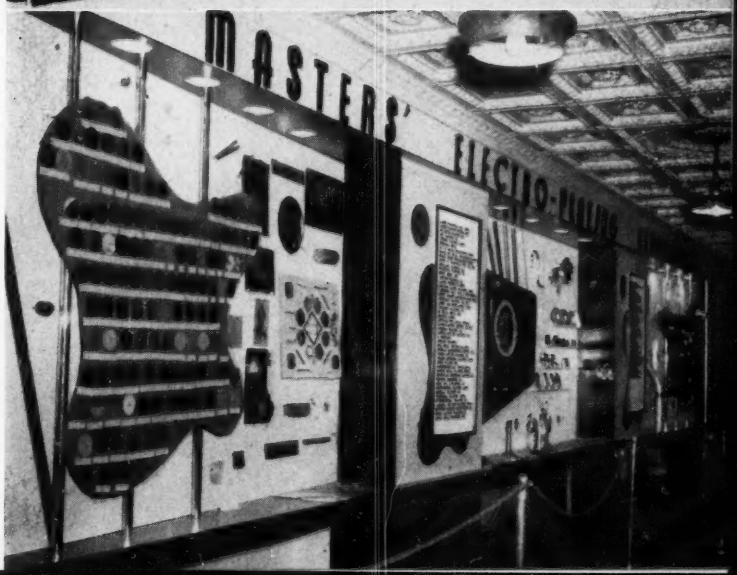


Fig. 15 — The Masters Electro-Plating Association assembled an impressive display showing the wide variety of both products and finishes represented in the work being done by association members. John J. Forbath, Star Chromium Corporation, served as Chairman of the committee responsible for the preparation of this display. Although not submitted in competition, the exhibit was awarded Honorable Mention.

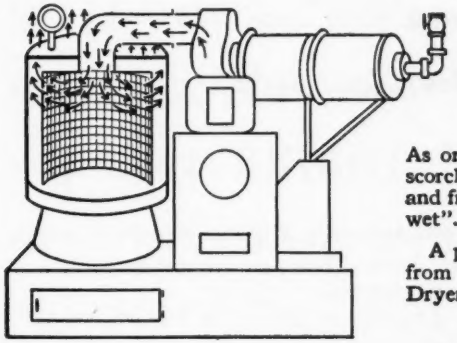
Fig. 16—A great deal of interest was displayed in electroless nickel deposition. One of the speakers who discussed electroless nickel plating was Dr. G. Gutzeit, Kanigen Division, General American Transportation Corp., Chicago, Ill. Mrs. Florence Marquardt (right foreground) recorded the events of the Convention as she has done for a number of years.

Fig. 17 — C. F. Nixon (right) installed the National Officers of the A.E.S. at the conclusion of the final business meeting. Shown (left to right) are: Francis T. Eddy, 3rd Vice President; Dr. Samuel Heiman, 2nd Vice President; Clyde Kelly, 1st Vice President; Dr. Ralph Schaefer, President; Dr. George P. Swift, Past President.

Fig. 18—The selection of Cincinnati as the Convention city for 1958 may have been influenced by the German band which paraded through the Statler lobby just prior to the final business meeting. Shown in the background are Wm. Young and Carl H. Truman, two Cincinnati boosters. L. A. Critchfield served as Chairman of the Cincinnati Boosters' Committee.

(PRODUCTS FINISHING Staff Photos)

EVER BLOW INTO AN ASH TRAY?

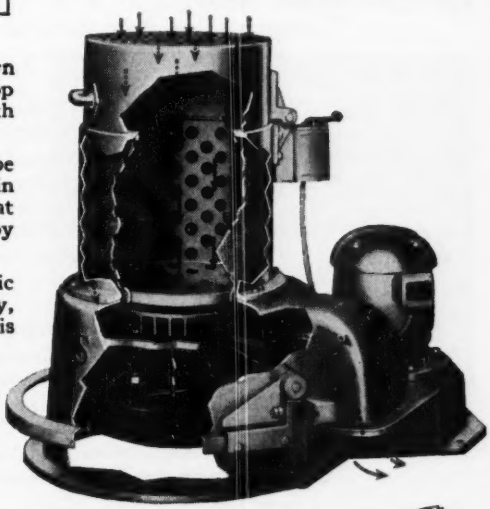


If you did, you saw a practical demonstration of the principle of air deflection. In old type dryers, air *blown* in from the top is deflected by the top layer of parts. As one user put it, "the top layer gets scorched, the next layer is nice and dry, and from there on down the parts are still wet".

A powerful suction fan *draws* the air from the bottom of the modern Nobles Dryer. Fresh air rushes in from the top to fill the vacuum and is drawn through the entire contents from top to bottom where it is expelled with the water.

Steam or electric heaters may be mounted compactly in the cover in contrast with space consuming, heat wasting, separate units connected by pipe.

An internal expanding, hydraulic brake stops the machine smoothly, and quickly. The "brake pedal" is a ring extending around the entire working area so that the machine can be stopped instantly from any working position. In the interest of faster drying and lower costs write today!



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1954 SHOP PRACTICE FORUM

PORCELAIN ENAMEL INSTITUTE

University of Illinois **Urbana, Illinois**

September 8, 9, 10, 1954

Wednesday, September 8

10:00 A.M.—Registration.

10:30 A.M.—Committee Meetings

12:00 Noon—Luncheon

1:30 P.M.—Presiding: Dr. A. I. Andrews, University of Illinois. Address of Welcome

1:45 P.M.—Response, W. A. Barrows, Barrows Porcelain Enamel Co., President, Porcelain Enamel Institute

2:00 P.M.—Industry Reports

"Continuous Dew Point Meter for Dryers and Furnaces."
L. C. FARROW, Clyde Porcelain Steel Division, Whirlpool Corporation.

"Reflective Bead Enamels."
D. C. BOWMAN, Chicago Vitreous Corporation.

"Mechanical Method for Determining Pick-up."
H. S. SAUNDERS, The O. Hommel Company.

"Use of Organic Dyes as A Spraying Aid."
G. S. MARTIN, Pemco Corporation.

"Use of Water in Furnace Atmospheres."
RAY McCOOK, Geo. D. Roper Corporation.

"Infra-red Drying."
To Be Selected.

"Effect of Mill Additions on Abrasion Resistance."
ROBERT SMITH, The Murray Corporation of America.

"Observations on Field Experiences of Enameled Ranges."
J. R. CRANDALL, National Bureau of Standards.

"Experiences in Use of Wetting Agents in Pickling Acids."
ALEXIS HANNAM, Heintz Mfg. Company.

"One Fire Finish for Food Freezers."
To Be Selected.

"Progress Report on High Temperature Coating of Furnace Tools."
T. F. MUELLER, Ferro Corporation.

"Experiences in the Enameling of Aluminum."
To Be Selected.

"Did you know that — Session."
(30 second helpful hints)
J. J. SVEC, Ceramic Industry.

"Enameling Plant Waste Disposal."
To Be Selected.

Wagner Brothers' laboratory, in close cooperation with the research staff of a leading Mid-Western university, has now developed a vastly superior **BRIGHT NICKEL PROCESS** unsurpassed for trouble-free operating characteristics and luster of finish

...IT'S NEW!

Wagner Brothers' NEW WABRITE Bright Nickel Process now offers you exceptional EASE OF CONTROL in plating to reduce rejects and maintenance costs, increase production. HIGH TOLERANCE for IMPURITIES permits sparkling finishes even with a high degree of solution contamination. CONVERSION of present baths to WABRITE is easily done—and without loss of nickel bath or original primary brightener. PITTING is EFFECTIVELY CONTROLLED by lowered surface tension of the solution. UNIFORM PLATE DEPOSITION into recesses is easily accomplished due to the EXCELLENT THROWING POWER (up to 100 amps/sq. ft.). LEVELING and HIDING characteristics of WABRITE are unmatched.

Additives need only infrequent replenishment, are extremely stable. Active WABRITE nickel provides a surface ideal for subsequent chrome plating.

Wagner Brothers' laboratory facilities are available for periodic solution checks to maintain your nickel bath at highest efficiency.

Let us demonstrate the obvious superiority of the Wagner Brothers' NEW WABRITE Bright Nickel Process. Mail coupon for additional information.

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GREATER LEVELING POWER
FASTER PLATING
BRIGHTER FINISH
SUPERIOR DUCTILITY
HIGH TOLERANCE FOR IMPURITIES
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EXCELLENT CONTROL
UNIFORM DEPOSITS

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Please send more information describing Wagner Brothers Wabrite Bright Nickel Process.

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STREET_____

CITY_____ ZONE____ STATE_____

P.E.I. Shop Practice Forum

Thursday, September 9

Session Chairman: J. L. McLaughlin, Dana Chase Publications. Chairman, Process Development Committee of the Porcelain Enamel Institute

9:30 A.M.—Processing Methods in the Enameling Industry

"Data Controlled Spraying."
J. J. BAKER, International Harvester Company.

"Electrostatic Spraying of Porcelain Enamel."
M. L. POUILLY, Illinois Spray & Equipment Company.

"Practical Aspects of Dipping."
PAUL S. CECIL, Seaporcel Metals, Incorporated.

"Questions & Answers."
Panel Members.

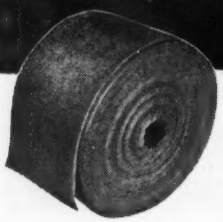
Session Chairman: E. E. Howe, Chicago Vitreous Corporation

10:50 A.M.—Guide Posts in the Enameling of Hot Water Tanks."
D. R. GOETCHIUS, Ferro Corporation.

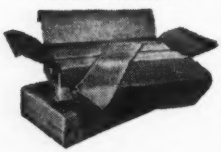
12:30 P.M.—Luncheon

For Dust Free Finishes!

BOND TACK CLOTH



IN ROLLS
Cut off any size piece to use as needed.



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STAYS SOFT AND TACKY — A SPECK-FREE FINISH EVERY TIME

Now Available in Rolls or Cut Bulk—White or Gold
In Three Different Types of Cloth

Get your Tack Cloth packed just the way it's easiest for you to use . . . either in 150 yard rolls of 36" wide cloth or in handy cartons . . . 100 or more Tack Cloths to the carton.
No matter which way you buy it, you can be sure that every square inch will stay SOFT and TACKY until the very last bit is used up!
The Cut Bulk size is 18" x 36" . . . folded to 4½" x 18" for ease of handling. ALL BOND TACK CLOTH is *Spontaneous Combustion Proof, Lint-Free* and *Wax-Free*. Gives a sparkling speck-free Finish *every time*. Clean and sanitary. No waste.

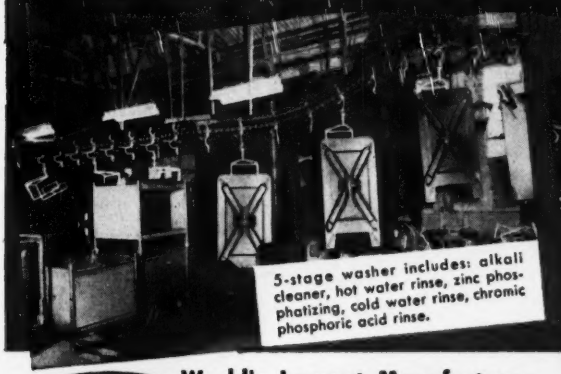
TRY THEM and COMPARE RESULTS. Samples Gladly Sent Upon Request.

BOND CHEMICAL PRODUCTS CO.
"The Tacky Wiper Specialists"
2639 N. CLYBOURN AVE. CHICAGO 14, ILLINOIS

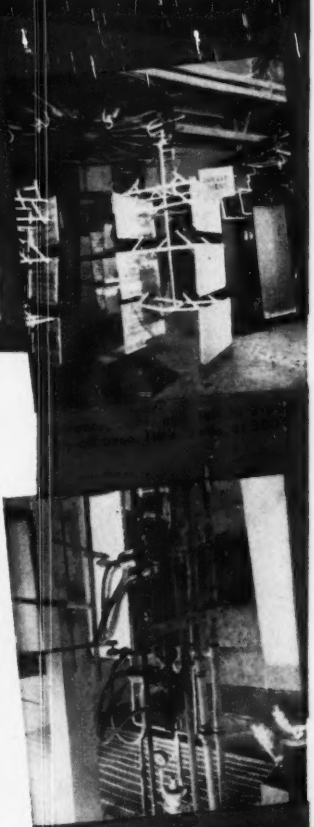
ALSO INDIVIDUALLY PACKED IN GLASSINE ENVELOPES
—144 to the Carton

A WARRANTY OF SATISFACTION IN EVERY CARTON

PRODUCTION INCREASED 150% with DESPATCH FINISHING SYSTEM



5-stage washer includes: alkali cleaner, hot water rinse, zinc phosphatizing, cold water rinse, chromic phosphoric acid rinse.



Amana World's Largest Manufacturer of Food Freezers Expands

As part of a major expansion program Amana Refrigeration, Inc., Amana, Iowa, installed a DESPATCH 2-coat, 2-bake electrostatic paint finishing system with a capacity of 400 freezers and 200 room air conditioners on an 8-hour shift. The new streamlined system is credited with increasing Amana's production by 150%, has greatly improved finish quality and has achieved substantial paint savings through more efficient paint application and paint reclamation processes.

Ware travels on a 27-foot continuous conveyor through 5-stage washer, dry-off oven, prime and finish staggered electrostatic spray booths, prime and finish touch up booths, prime and finish multiple pass bake ovens and inspection area to three assembly lines.

A COMPLETE SYSTEM OR A SINGLE UNIT

Despatch Finishing Systems are designed and built better, faster and more economically. You can get a individual un Dept. C for d

OVEN COMPANY

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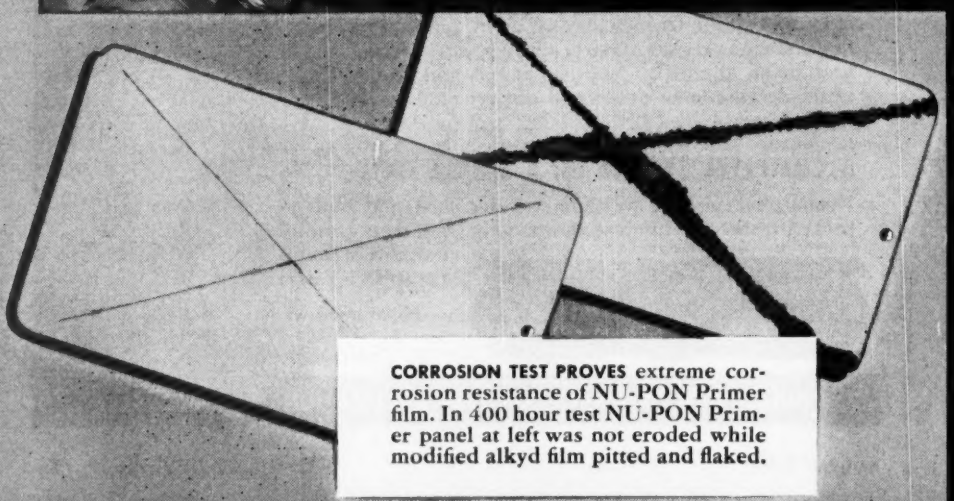
PIONEERS IN ENGINEERING HEAT APPLICATIONS FOR INDUSTRY

COLOR STYLISTS at the Glidden Color Studios will prescribe colors for your unit which harmonize with all that's new in floor covering, fabrics, and wall colors, to give your product maximum sales appeal.



CORROSION TEST PROVES extreme corrosion resistance of NU-PON Primer film. In 400 hour test NU-PON Primer panel at left was not eroded while modified alkyd film pitted and flaked.

CORRECT COLOR ON THE *Outside...*

CORROSION-RESISTANCE *Inside*

AIR CONDITIONERS made more salable, more durable by two Glidden Services

Glidden offers you valuable assistance on two key problems in the finishing and styling of your air conditioners.

First, Glidden can supply you with the ideal protective finish for unit interiors—moisture resistant, corrosion resistant NU-PON Primer. This new coating is ideally suited for application by flow-coating in a film thickness half that of standard alkyd primers.

Second, The Glidden Color Studios offer you custom color styling that adapts your unit to today's decorating trends and enhances product design. These specialists, who developed the famous SPRED SATIN Dramatone color system for home decorating, have color styled a wide variety of products for leading manufacturers.

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P.E.I. Shop Practice Forum

Session Chairman: J. B. Willis, Pemco Corporation.

2:00 P.M.—Color In The Porcelain Enameling Industry

This important session is scheduled for the entire afternoon. Topics and speakers are being selected so as to present as much usable information as possible on this vital subject for the enameling company representatives present. Tentative topics include, "Why Color is Necessary" (with slides), "Advantages for Porcelain Enamel in the Trend to Color," "Production of Colors," "Measurement and Control of Colors," "Production Aids When Processing Colored Ware."

Friday, September 10

Session Chairman: Dr. G. H. Spencer-Strong, Pemco Corp.; Chairman, P.E.I. Quality Development Committee.

9:30 A.M.—Practical Tests For The Enameling Industry

To be presented in a short, demonstrative fashion are certain practical tests for the enameling industry. These tests are from the work of the Quality Development Committee, and from other sources. It is planned to present several actual demonstrations of tests. Tentative topics include new PEI Abrasion Test, Test for Hot Water Tank Enamels, Test for Alkali Resistance, work on Gouge Test, and others.

Improve Quality — Reduce Finishing Costs with CENTRAL POLISHING MACHINES

Hydraulically operated. Anyone can operate. Extremely versatile. Handle long lengths, extrusions, sheets and many odd-shaped pieces. Polish extrusions and sheets their ENTIRE LENGTH. Polishing stroke quickly adjustable 2 inches to full capacity. Our patented Hydraulic Contour Device permits the finishing of a wide variety of shapes and contours.

- **Polishes extrusions and sheets complete, end to end.**
- **Adjustable stroke 2" to full capacity. Machines, 7 to 22 foot stroke.**

Also Double Roll Vertical Models.

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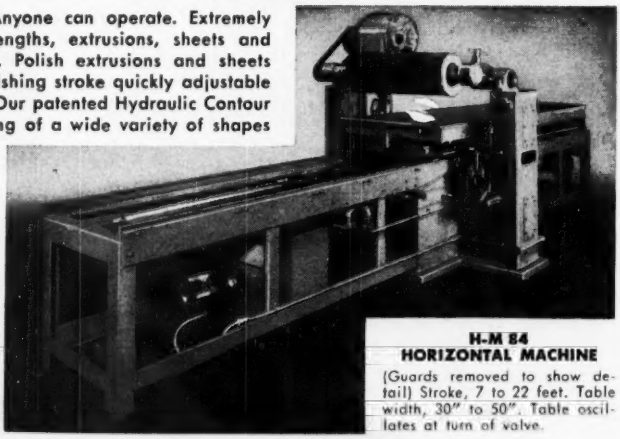

H-M 84 HORIZONTAL MACHINE

(Guards removed to show detail) Stroke, 7 to 22 feet. Table width, 30" to 50". Table oscillates at turn of valve.

CENTRAL MACHINE WORKS

72 COMMERCIAL ST. • WORCESTER, MASS.

Ransburg Electrostatic Processes

Whether it be painting of automobile bodies —(in one case, saving $1.81 per body)— or painting smaller automotive parts, RANSBURG ELECTROSTATIC PROCESSES are accounting for substantial savings to the manufacturer, and to the buying public. *An accumulated savings amounting to several dollars per car!*

In various plants here and abroad, industry is relying upon the unmatched efficiencies of the Ransburg Electrostatic Processes to paint these automotive parts:

BODIES • GARNISH MOULDINGS • DIRECTIONAL SIGNALS • MUFFLERS
SEAT FRAMES • TAIL PIPES • VENTILATOR PARTS • JACKS • ENGINES • HORNS
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AIR FILTERS • OIL FILTERS • SHOCK ABSORBERS • RADIOS • HARDWARE
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WHEELS • CHASSIS • GASOLINE TANKS • FRONT SUSPENSION UNITS
REAR AXLES • ELECTRICAL EQUIPMENT • REAR VISION MIRRORS

WHAT DOES IT COST TO USE RANSBURG ELECTROSTATIC PROCESSES? It doesn't COST! It SAVES! Let us show you how Ransburg Electro-Spray can cut your painting costs and provide higher quality work in YOUR finishing department.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

P.E.I. Shop Practice Forum

Session Chairman: J. F. Matejczyk, The O. Hommel Company.

10:50 A.M.—One Coat Application of White Porcelain Enamel to Steel

11:20 A.M.—"Processing Variables in One Coat Application of White Porcelain Enamel in the Utensil Field."
DR. A. L. FRIEDBERG, University of Illinois.

11:40 A.M.—"Observations in Application of White Porcelain Enamel Direct to Steel."
FRANCIS ELLINGER, Ferro Corporation.

11:50 A.M.—Discussion.
E. E. BRYANT, Ferro Corporation.

12:10 P.M.—"Fundamentals of Metal Cleaning."
G. A. LUX, Oakite Products, Inc.

12:35 P.M.—"Automation for the Enameling Industry."
ROBERT SHLIVAK, Ferro Corporation.

YOU'LL SAVE COSTLY HOURS OF LABOR
WITH RAMCO® 1-BOLT ACTION DOOR
ON RAMCO VAPOR DEGREASERS
MANUALLY OPERATED, CONVEYORIZED POWER WASHERS
NO BOLTS TO FREEZE OR CORRODE
A TWIST!
A TURN!
...IT'S OPEN IN JUST 5 SECONDS!
Note cross section above showing how Ramco 1-Bolt design makes possible 100% drainage; traps all sludge in easy-to-clean pocket. Cuts down gasket replacement. No need to remove steam coil and door; no need to disconnect steam lines.
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All-Purpose Solvent for Vapor Degreasing

First solvent produced to give unsurpassed performance in any degreasing job—available after August 1, 1954

Now—for the first time—you can buy *one* brand of trichlorethylene with complete confidence that it will do *any* of today's difficult vapor degreasing jobs—quickly and efficiently. That *one* brand is Du Pont's *new* "TRICLENE"* D trichlorethylene.

With the greatest all-around ruggedness ever built into a trichlorethylene, *new* "TRICLENE" D gives you unsurpassed resistance to *all* (not just a few) major causes of solvent breakdown. This means dependable performance and operating economy in *any* vapor-degreasing job—in any vapor degreaser.

You profit from fewer work interruptions for clean-outs. You have maximum protection against costly rejects due to solvent staining or etching. And *new* "TRICLENE" D retains its high purity and stability even after repeated use and distillation. All these advantages, and there's only *one* brand of trichlorethylene to stock—all-purpose "TRICLENE" D.

Try *new* "TRICLENE" D and see for yourself why it is considered to be the greatest improvement ever made in any trichlorethylene for vapor degreasing. For more details, fill out and mail coupon below.

*REG. TRADE-MARK

ONLY NEW "TRICLENE" D HAS THE ALL-AROUND RUGGEDNESS TO ASSURE YOU:

Unsurpassed resistance to attack from light metal chlorides (i.e., aluminum chloride).

Unsurpassed resistance to attack from light, heat and air.

Unsurpassed resistance to attack from acidic materials, such as detergents, drawing compounds, sulfurized oils, etc.

Unsurpassed freedom from salt-forming inhibitors and materials that cause staining or deposits on most metals.

Unsurpassed stability, even after long performance in tough degreasing jobs and after repeated distillation.

New All-Purpose

"TRICLENE" D

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

SEND FOR THIS NEW DESCRIPTIVE FOLDER

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☐ Please send me your descriptive folder on new "TRICLENE" D.

☐ Please have your representative call with the details.

Name _____ *Position* _____

Firm _____

Address _____

City _____ *State* _____

Exact tolerances previously destroyed by corrosion

...are now kept micrometrically exact with

How Exon 402-A wipes out corrosion

A 2-headed problem faced Norris-Thermador Co. of Los Angeles. They use large rings like stencils to plate copper onto kitchenware. Painfully exact tolerances are mandatory. But the corrosive solutions used ate away the tolerance, ruined rings, skyrocketed costs.

Engineers ransacked industry's resources for one material that could hold tolerance in so corrosive a solution. They found it in Boltaron 6200.

After a year, Boltaron 6200 rings show no sign of corrosion. Replacement costs? Wiped out!

Installation by Horace Blackman Co.

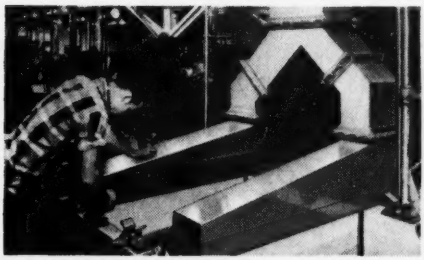
●

Photographs courtesy
H. N. Hartwell & Son, Inc., Boston 16, Mass.

●

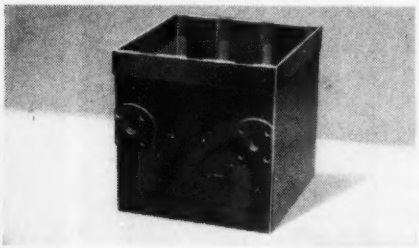
NOTE: Firestone supplies the resin only, does not manufacture the end product.

Boltaron 6200



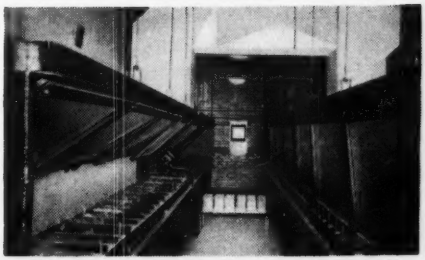
★ Maintenance costs were wiped out at Cannon Electric Co., Los Angeles. A metal-corroding solution of 33% nitric, 33% sulfuric acid and 33% fluoride salts has left Boltaron ducts and tanks unmarked for a year.

Installation by Horace Blackman Co.



★ Eastman Kodak Co., Rochester, reports that Boltaron 6200 remained completely uncorroded by ferricyanide after 3 years, when no other material lasted 3 months.

Installation by Industrial Plastic Fabricators, Inc.



★ For 18 months, sulfuric acid fumes have failed to corrode a Boltaron fume removal system at Electric Storage Battery Company, Fairfield, Conn.

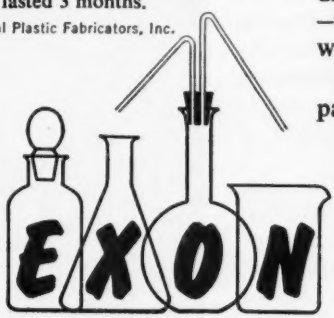
NEW RIGID, extremely versatile lightweight materials are making corrosion a memory in industry all over America. These unplasticized polyvinyl chlorides are typified by Boltaron 6200.

Firestone's Exon 402-A resin meets Boltaron's exacting specifications—best assurance of uniform results under the most corrosive conditions.

These materials can be welded, sawed, sheared, stamped, milled, molded, planed, drilled, embossed, rolled and cemented—on conventional woodworking or metalworking equipment.

For details that will interest you in particular, call or write:

Firestone



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Spotlighting FINISHING Progress

Electroplating on Molybdenum

THE mechanical properties of molybdenum and molybdenum-base alloys at temperatures above 1800 deg. F. are superior in most respects to those of any of the high-temperature alloys used at present. However, design engineers can not make use of this exceptional metal at present, because of its poor oxidation resistance at elevated temperatures. Molybdenum is subject to what has been called "catastrophic oxidation." The molybdic oxide which forms is very volatile, and above 800 deg. F. the molybdenum literally burns up with a cloud of white smoke. It is generally agreed that the last remaining problem to be overcome in order to permit the use of molybdenum at elevated temperatures is that of protecting it from oxidation.

An attempt to accomplish this by electroplating is described in a report entitled, "Introductory Plating Studies on Protecting Molybdenum from High-Temperature Oxidation," by L. E. Vaaler, C. A. Snavely, and C. L. Faust, of Battelle Memorial

Dr. Seymour Senderoff
Supervisory Chemist,
Electrodeposition Section
National Bureau of Standards

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

cut cleaning costs RIGHT DOWN THE LINE!

METALWASH VAPOR DEGREASERS are 4-Ways BETTER!

UNOBSTRUCTED TANK WALLS. The condensing coil and trough are recessed into a back compartment providing *superior vapor control, more efficient solvent reclamation,* and an *unobstructed working area.*

WATER SEPARATOR and PUMP CHAMBER, fabricated of stainless steel, are *unitized* for easy removal in minutes.

SIMPLIFIED MAINTENANCE. Service connections, clean-out openings, and controls are located at one end of machine.

DEMAND-TYPE WATER CONTROL. Out of Metalwash research has come the improved technique of water temperature regulation for greater control and water conservation.

All types of vapor degreasers, automatic or hand operated, are available in standard and special sizes.

WHAT YOU SHOULD KNOW ABOUT *Vapor Degreasing*

METALWASH has prepared an authoritative, illustrated booklet containing a description of the theory and operation of vapor degreasers plus diagrams and cutaway photographs of the three basic types of degreasers. **Write today for your Free copy.**

METALWASH ®

WASHING PICKLING DRYING PHOSPHATIZING DEGREASING

METALWASH MACHINERY CORPORATION
915 North Avenue, Elizabeth 4, N. J.
In Canada, Canefco, Ltd., Toronto, Ontario

Institute.* Two difficulties in electroplating on molybdenum are: (1) adherence cannot be obtained by the usual methods of pretreatment for electroplating; and (2) pinholes, bare contact areas, and other discontinuities must be entirely absent for effective protection. It has been found that the oxide which forms through a pinhole in a protective coating accelerates further attack on the molybdenum; and as a result, a very large area of molybdenum is destroyed in the vicinity of a very small discontinuity in the plate. In order to eliminate bare contact areas in the samples which they plated for oxidation tests, the authors plated the lower part of a specimen first, then reversed it end for end and plated the bare portion,

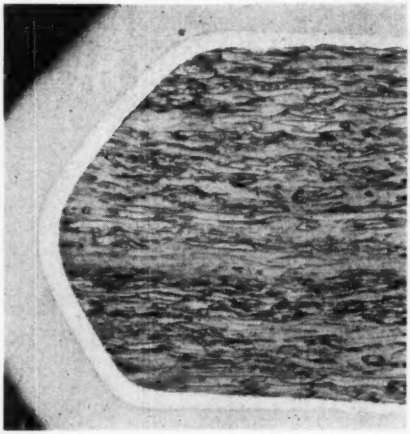

Fig. 1—Nickel plate over chromium plate on molybdenum, cross-section at edge of sample. 100X.

with an overlapping region in the center.

Three pretreatments are described in the report. They are:

(1) Etch with alternating current in concentrated hydrofluoric acid at a temperature of 70 to 90 deg. F. at a current density of 700 amp./sq. ft. for three minutes.

(2) Immerse in the following solution at a temperature of 70 to 90 deg. F. for one minute.

Potassium hydroxide (KOH)	10 gm.
Potassium ferricyanide ($K_3Fe(CN)_6$)	30 gm.
Water	100 ml.

(3) Clean anodically in hot 30 per cent potassium hydroxide solution for one minute at a current density of 140 amp./sq. ft., immerse in 1:3 nitric acid at a

*United States Atomic Energy Commission Report, BMI-813, April 1, 1953. (Obtainable from Office of Technical Services, Department of Commerce, 20¢)

ELIMINATE COSTLY REJECTS IN YOUR FINISHING DEPT. WITH DETROIT "TAC" RAGS
DETROIT HANDY "TAC" RAG
PICKS UP DUST LIKE A MAGNET
DETROIT "TAC" RAGS are an absolute necessity for cleaning any metal, wood or plastic surface before painting. Removes all dust, lint and sanding particles. Order today through your supplier.
STANDARD OF THE FINISHING INDUSTRY SINCE 1934
DETRO MFG. & SALES CO., INC., CULVER CITY, CALIFORNIA

For Brighter-Finer -Economical Burnishing

Lasalco's BURNISHING BARREL

Equipment every finishing shop needs! Rugged construction offers years of dependable, low-cost, efficient service that means greater profits.

- Permanent packing rings seal the steel covers.
- Barrel is tilted and held in any desired position by easy-to-operate worm gear.
- No wrenches are needed to close cover. A single wheel makes it an effortless, one-hand job.
- Slippage is eliminated by a durable, long-life V-belt.
- Motor is mounted high for protection against moisture.
- Cylinder is fabricated of steel with wood liners. May be used without wood liners if preferred.

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2818-38 LASALLE STREET • PROSPECT 1-2990 • ST. LOUIS 4, MISSOURI

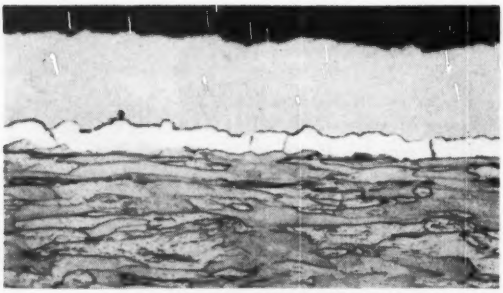

Fig. 2—Cross-section of central area of sample shown in Fig. 1; separation of nickel and chromium electroplates apparent. 250X.

temperature of 70 to 90 deg. F. until gas is evolved uniformly, and then immerse in the hot alkaline ferricyanide solution (above) for a few seconds to remove the brown film formed during the nitric acid pickling.

The following types of plating were then applied to the activated molybdenum specimens.

A. Nickel Plating

(1) Pretreat by one of the above methods.

(2) Nickel strike in the following bath:

Nickel chloride ($NiCl_2 \cdot 6H_2O$)	240 g/l
Hydrochloric acid (HCl, conc.)	82 ml/l
Current density	50 amp./sq. ft.
Temperature	80 deg. F.
Time	15 min.
Work-bar agitation	

(3) Nickel plate in the following Watts bath:

Nickel sulfate ($NiSO_4 \cdot 7H_2O$)	240 g/l

NEWCOMB-DETROIT

PIONEERS IN ENGINEERING, MANUFACTURE AND INSTALLATION OF

INDUSTRIAL OVENS
SPRAY BOOTHS
PARTS WASHERS
DUST COLLECTORS
AIR SYSTEMS

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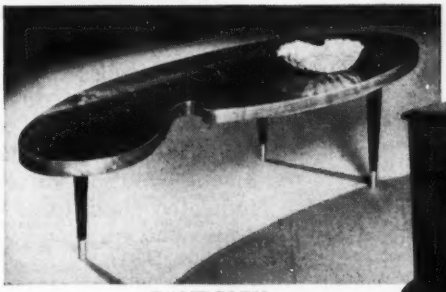
SETH BEN-ARI, head of SETH BEN-ARI INC., Scotch Plains, N. J., internationally known designer and producer of furniture originals, has this to say about RANDOLPH WOODWORKING FINISHES:

"The choice of the right finish for custom-made furniture is the important, concluding step of an exacting job. We use Randolph Finishes because they give our work the final touch of perfection required by our high standards."



RANDOLPH
Clear Rubbing Wood Lacquer 4703
is an ideal finish
for this modern coffee table.

RANDOLPH
Water White Clear Wood Lacquer Y8012
was selected for
this French provincial dresser

Randolph FINISHES

Consider carefully this tribute by a master creator in the furniture maker's art. Every effect of quality, beauty and function is preserved and enhanced by the application of a Randolph surface coating "custom-formulated" for each individually-fashioned piece of furniture.

Can you express the same satisfaction with the finishes presently used for your products?

There is an equally fine Randolph finish available for your product, whether it is made of metal, wood, plastic or fabric. You can get prompt action on your finishing needs by writing us today!

Send for our free folder
on Woodworking Finishes

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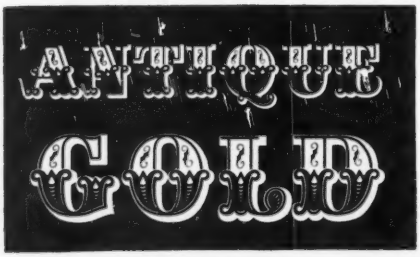
ENAMELS
LACQUERS
THINNERS

RANDOLPH
PRODUCTS COMPANY
CARLSTADT, NEW JERSEY



BY AUROMET

Auromet Antique Gold is an economical one-dip process that can be uniformally deposited from a trouble-free solution.

Auromet Antique Gold is deposited in a few seconds from a solution that can be used in conventional electroplating equipment.

Auromet Antique Gold can be furnished with different colored backgrounds.

Auromet Corporation also manufactures Gold Salts and Concentrates, Bright Gold, Silver, Silver Cyanide and Nitrate, Platinum, Palladium and Rhodium Concentrates.

For complete information and technical service call WOrth 6-9863 collect.

Write today for Auromet's free technical folder giving data on Antique Gold and other precious metal plating salts and solutions.

AUROMET
CORPORATION
199 CANAL ST., NEW YORK 13, N. Y.

Nickel chloride ($NiCl_2 \cdot 6H_2O$)	45 g/l
Boric acid (H_3BO_3)	30 g/l
pH	2.0
Current density	40 amp./sq. ft.
Temperature	140 deg. F.
Time	40 min.
Work-bar agitation	

(4) Rerack and repeat previous steps 1 to 3.

B. Chromium Plating

(1) Apply one of the three pretreatments described above.

(2) Anodically etch in the following solution under the indicated conditions:

Chromium trioxide (CrO_3)	400 g/l
Sulfuric acid (H_2SO_4)	4.0 g/l
Current density	280 amp./sq. ft.
Temperature	100 deg. F.
Time	2 min.

(3) Chromium plate from same solution:

Current density	500 amp./sq. ft.
Time	15 min.

(4) Rerack and repeat previous steps 1 to 3.

C. Iron Plating

(1) Pretreat as previously described.

(2) Dip in 1:1 HCl for a few seconds.

(3) Iron plate from following solution:

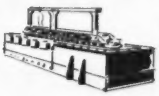
Ferrous ammonium sulfate ($Fe(NH_4)_2(SO_4)_2 \cdot 6H_2O$)	350 g/l
Sulfuric acid (H_2SO_4)	To pH 2.0
Current density	70 amp./sq. ft.
Temperature	Above 190 F.
Time	10 min.
Work-bar agitation	

D. Nickel Plating on Chromium Plated Molybdenum

to page 76→

WORLD LEADERSHIP IN 10 SHORT YEARS!

Simplicity of design, durability of construction and the economies of accurate plating have built Udylite leadership in automatic plating equipment in a decade



Yes, it was only ten short years ago that Udylite delivered its first hydraulic fully automatic plating machine. Since that time Udylite sales of equipment have mounted each year until today Udylite machines are in use in every country in the world where manufacturing in metal is important. In fact, the deliveries of Udylite plating machines in 1953 reached an all time high, and repeat orders were an important factor in this record.

Ingenious engineering is one of the reasons behind the Udylite success story. Many Udylite machines have been in operation for 24 hours a day, seven days a week for years. And all of this performance with practically no replacements. In fact, the recommended *spare part list for the Udylite machine totals less than one hundred dollars.*

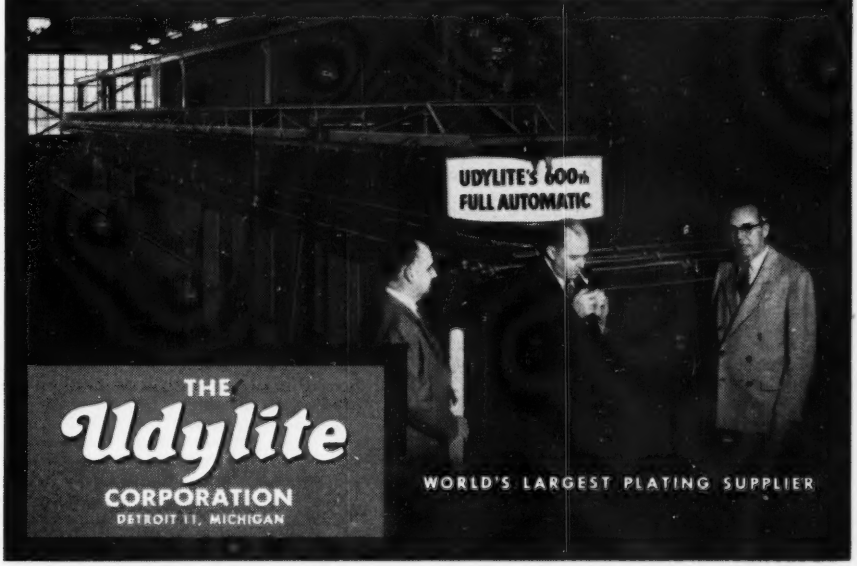
Udylite machines are being used today in plating hundreds of different products . . . from small telephone relays to bulky tubular furniture, and for almost as many different processes.

The Udylite Full Automatics engineered and built to suit the need have ranged in size from 20 feet to 500 feet in length. Udylite can furnish a machine for every plating or finishing problem.

If you have a metal finishing production problem, Udylite Full Automatic Equipment can help you.

Official inspection of Udylite's 600th Full Automatic, 100 feet long, built to copper, nickel, chrome plate 3,000 cigarette lighters per hour.

Write for the booklet "Udylite Automation in Plating" — the story of Udylite Full Automatics in industry today



Here is the

PARKER LINE

metal surface treatments that aid production, improve product quality, enhance appearance and durability...

BONDERITE

corrosion resistant paint base

This well-known product is used to prepare metal for fine baked paint finishes on thousands of products. Automobiles, trucks, refrigerators, domestic appliances of all kinds, control boxes, metal furniture, office partitions, transformers, and toys are a few of the types of products on which Bonderite is used.

Applied by either spray or immersion, Bonderite creates a nonmetallic phosphate coating over the entire surface. This coating is integral with the metal surface, forming an effective barrier against the penetration of moisture, and furnishing an excellent base for paint.

Bonderite produces dependable results of uniformly high quality, is easily controlled and economical in operation. It may be used to treat steel, aluminum, zinc, and cadmium.

Bonderite adds durability and appearance protection to painted metal by combating corrosion and anchoring the paint securely.

PARCO COMPOUND

rust resistant

This is the standard corrosion protection for iron and steel.

Iron and steel parts to be treated are immersed in Parco Compound solution, which creates a nonmetallic crystalline phosphate coating over all the surfaces of the metal. Complex shapes of all sizes from steel boat plates down to nuts, bolts and screws are treated with Parco Compound. Treatment is simple, controls are easily maintained, and cost is extremely low.

BONDERITE and BONDERLUBE

aids in cold forming of metals

These two Parker products are a big factor in accomplishing the present revolution in cold forming techniques. Nonmetallic Bonderite, used in tube mills for many years to hold lubricant, protect dies from excessive wear, and allow greater reductions—combines with the amazingly effective Bonderlubes to transform problem draws and extrusions into production routine.

The combination of Bonderite and Bonderlube is used extensively in the manufacture of shells and cartridge cases, shafts, gears and pins, making important savings in time, money, and material.

PARCO LUBRITE

wear resistant for friction surfaces

The nonmetallic phosphate coating created by this Parker Product reduces wear on friction parts and bearing surfaces. It is used on gears, pistons, piston rings, shafts, valves, pinions, cylinder linings, cams and other automotive and machine components.

Parts are treated by immersion in Parco Lubrite solution. The coating produced by this treatment prevents metal-to-metal contact, holds lubricants, reduces danger of galling and scratching, prolongs service life by protecting mating parts during the critical break-in period.

PARCOLACS

special finishes

Parcolacs are a group of special finishes to be used over Parco Compound. They include wax base finishes, stains, and rust preventive oils suitable for application by dip, spray, or centrifuge. There are types to meet slow or fast drying requirements, and other desired specifications. Parcolacs add to the appearance and performance qualities of the articles treated.

NEW! PARCOLAC BLACK AND PARCOLAC ALUMINUM

Two new Parcolac finishes can now be used over Parco Compound to enhance appearance and add greater corrosion resistance. Parcolac black and Parcolac aluminum are phenolic type finishes, applied by centrifuge, with excellent color and appearance and especially good resistance to corrosion. Excellent for parts that will be called on to withstand severe exposure and maintain good appearance.

ENDURION

corrosion resistant treatment in gray and olive drab

Two distinctive immersion treatments designed to react chemically with Parco Compound coatings to produce superior corrosion resistance. Easily controlled, simple to operate, Endurion produces uniform coatings which do not materially change the dimensions of the parts being treated. Very little additional equipment is required.

Endurion treatments are recommended where increased corrosion resistance is specified or where the chemically produced permanent colors are required.

PARCO CLEANERS

metal cleaners and conditioners

This line of scientifically formulated metal cleaners includes alkali, acid, and emulsion type cleaners. They not only remove grease and soil from the metal, but condition it for the next step in finishing. The line is complete, and includes one that can meet your production cleaning requirements.

**Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U. S. Pat. Off.*

MAINTENANCE PAINTS. A complete line of maintenance paints manufactured for 70 years by The Tropical Paint & Oil Co., subsidiary of Parker Rust Proof. A product to meet each and every one of your maintenance paint problems.

PARKER

RUST PROOF COMPANY

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Since 1915— leader in the field

PARKER PRODUCTS MEET GOVERNMENT SPECIFICATIONS

Complete list of Parker Products which meet government specifications available. Write for your copy!

PARKER RUST PROOF COMPANY
2172 E. Milwaukee, Detroit 11, Mich.

Please send me information on the products I have listed below:

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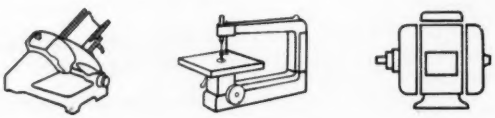
Name_____

Firm_____

Address_____

Here's more that Lowe Brothers THERMO SPRAFIL® system is the "hottest" news in industrial finishes today!

As a manufacturer of both hot and cold lacquer systems, Lowe Brothers have found that the hot lacquer system is rapidly becoming the *preferred system* in an increasing number of manufacturing plants. The reasons?—Faster handling and lower cost of all finishing operations. Here's a typical case history.

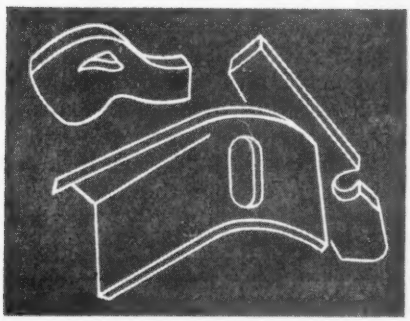


NOTE: This advertisement is based on facts from Lowe Brothers case history files.

"case history" proof

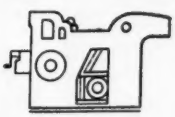
CASE HISTORY: *Thermo Sprafil System* eliminates 3 baking operations—speeds up production!

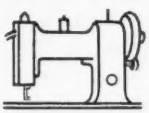
Wanting to speed the flow of heavy castings through his finishing operation, a large eastern manufacturer installed the *Thermo Sprafil* "hot" system at the suggestion of a Lowe Brothers "Finishing Specialist." Here's what happened: 1. Due to *Thermo Sprafil's* fast drying advantages, *three* separate baking operations were eliminated on every casting! 2. Sanding was eliminated! 3. All handling time and labor required to put castings through the *three* bakings were eliminated. 4. The three ovens were removed, releasing many square feet of vital factory floor space for other use. 5. Actual time required for complete finishing operation on each casting was cut from 12 to 4 hours.

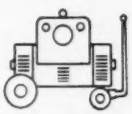


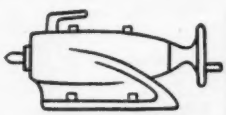
More and more manufacturers are seeing proof that Lowe Brothers *Thermo Sprafil System* provides the finest in finishing results while *eliminating* many of the costly and time consuming features of old cold lacquer systems. Get full details about the *modern Thermo Sprafil System*. Let a Lowe Brothers "Finishing Specialist" give you his recommendations based upon complete knowledge of the most up-to-the-minute finishing developments. No obligation. Why not write for more information today?

THE LOWE BROTHERS COMPANY • Dayton 2, Ohio
Industrial Division
District Offices:
Atlanta, Boston, Chicago, Jersey City, Kansas City









***Thermo Sprafil* is saving money and speeding production for manufacturers of a wide range of products. How about yours?**

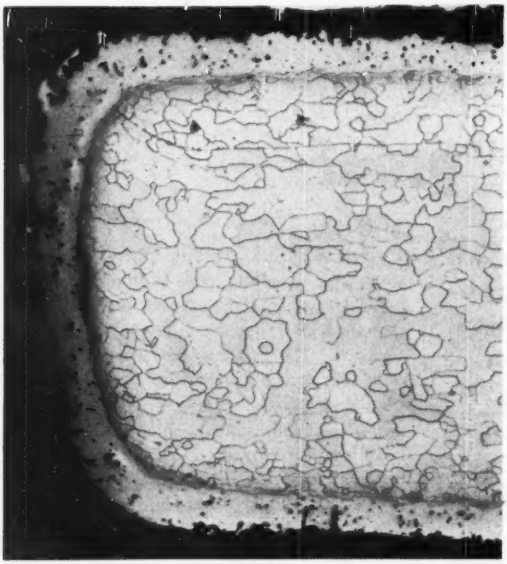


Fig. 3 — Nickel plate over chromium plate on molybdenum after 100 hours at 1800 deg. F. in air; cross-section at edge of sample. Weight loss: 0.1 per cent of original weight.

(1) Dip in 1:5 HCl solution until gas has evolved for several seconds.
(2) Nickel plate as in (A) starting with step (2).

E. Nickel Plating on Iron Plated Molybdenum
(1) Dip in 1:1 HCl until gassing is uniform.
(2) Proceed as in (A) starting with step (3).

The plated specimens were tested for blistering by heating in vacuum, and tested for oxidation resistance by heating in a furnace in air. The details are shown in Table I. It will be noted that samples plated directly with nickel or with nickel over chromium have considerable oxidation resistance at 1800 deg. F. even though the deposits blistered. On the other hand, the authors point out, when nickel is plated over iron, the oxidation resistance of the specimen is poor, even though the coating is blister-free. Finally, the alkaline ferricyanide treatment seems to be

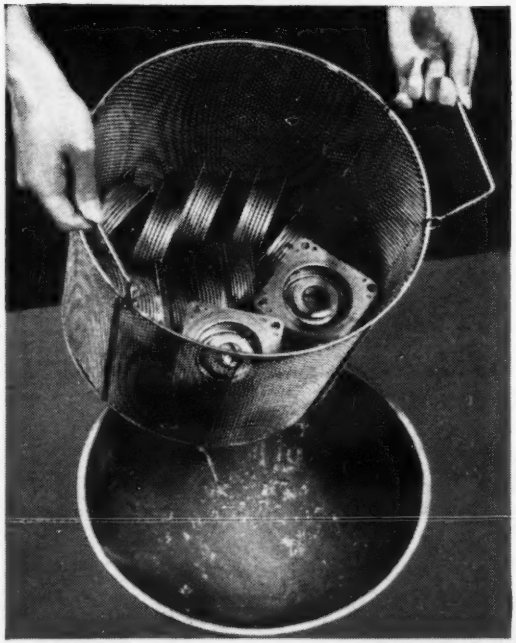
Table I

OXIDATION RESISTANCE OF NICKEL PLATED MOLYBDENUM

Pretreatment	Prior Electro-deposit	800 deg. F. Vacuum (100μ) Test Results	Oxidation Test Temp. deg. F.	Per Cent of Original Weight* Lost During 100-Hour Test			
				Sample No.			
				1	2	3	4
Alkaline Ferricyanide	None	Blisters	2000	15	70	89	100
Same	"	"	1800	—1.2	0.2	1.2	9.4
Same	Chromium	"	"	0.1	0.1	4.4	6.6
Same	"	"	"	—1.2	—0.6	0.8	47
AC in HF	"	"	"	100	100	100	100
KOH-HNO_3-Ferricyanide	Iron	No Blisters	"	6	100	100	7

* Original weight about 3 grams.

Bendix ultrasonic cleaner cuts labor costs 74.9%, slashes solvent costs 98.2%



Here is a typical case history* of how a Bendix Ultrasonic Cleaner** sharply reduces the cost of thoroughly cleaning processed parts . . . and, at the same time, *does a far better cleaning job than any other known method.*

THE PROBLEM: To remove polishing compounds, rouge, oils, and other foreign matter from precision instrument parts. These were being pressure-washed and hand-brushed with a solvent solution. Three serious shortcomings existed: 1. Considerable contamination still remained after cleaning; 2. Hand-brushing parts individually was slow and costly; 3. Solvent costs were high.

THE SOLUTION: A Bendix Ultrasonic Cleaner was put to work with these results: 1. All parts are consistently clean . . . even including blind holes and mechanical interstices previously almost inaccessible; 2. A 74.9% saving is being made in direct cleaning labor; 3. *The cost of solvents is down 98.2%* because the Bendix Ultrasonic Cleaner uses a water-detergent solution.

Do you know what contamination is costing you? Our Customers' Service Laboratory will be glad to show you how *really* clean a part can be. Write today for full particulars.

**Ask for other case histories.*

***Available in capacities up to 12" in diameter and 12" in depth for use in cleaning metals, glass, rubber, plastics, ceramics, etc.*

PIONEER-CENTRAL

Division of Bendix Aviation Corporation — THE NAME ANTICIPATES TODAY

. . . now serving industry through **ultrasonics**

2700 Hickory Grove Road
Davenport, Iowa

Export Sales: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

superior to the hydrofluoric acid etch.

Metallographic samples were taken from some of the specimens which had been subjected to oxidation. Figure 1 is a photomicrograph of one of them showing an apparently good bond between the nickel and chromium layers. Figure 2, from another part of the same sample shows separation between the nickel and the chromium. Figure 3 shows a sample in which the weight loss during the oxidation tests was very low and in which the adherence of the nickel plate was good. In Fig. 4 is shown a section of a specimen in which the weight loss was considerably greater and in which the nickel had separated from the chromium. The authors note that the chromium seems to adhere well to the molybdenum in all cases.

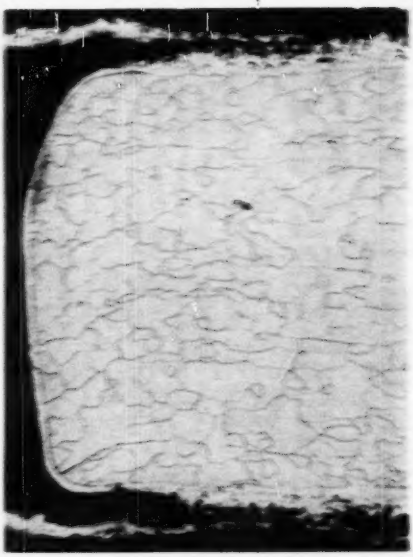


Fig. 4—Sample similar to that in Fig. 3, showing apparent separation between nickel and chromium plates. 100X. Weight loss: 4.4 per cent of original weight.

(Illustrations courtesy Battelle Memorial Institute, Columbus, Ohio.)

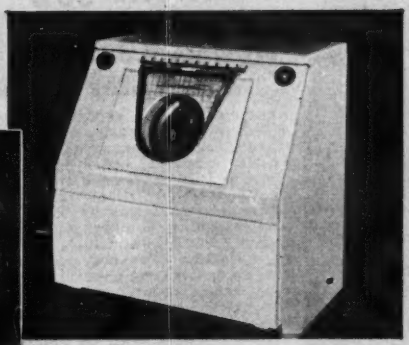
The authors tried to produce plates which would not blister when heated, by subjecting the plated specimens to a controlled heat treatment, by varying the pretreatment prior to plating, and by copper plating the molybdenum using both cyanide and acid copper baths; but they do not report any procedure which they consider satisfactory.

D-Chrome Plating

DR. A. Kutzelnigg, in METALLOBERFLACHE, 7B, 156 (1953), describes what he considers to be a new type of chromium plat-

EPON RESIN does it!

WESTINGHOUSE Laundromat gets a tougher, more corrosion-resistant primer at much lower cost!



Laundromat has a baked Epon, flow-coated primer formulated by Pittsburgh Plate Glass Company. Film uniformity calls for only the briefest scuff sanding before application of the white enamel top-coat.

HERE'S HOW...

The protective finish on a washing machine is exposed to severe conditions during its service life. It must withstand abrasion, impact, attack from alkalies and detergents.

Recently, Westinghouse engineers adopted a greatly improved finish for Laundromat components, using a new *primer* based on Epon resin. Applied by flow coating, the primer is only one-third the thickness of previously used primers. Tests have established a *three-fold* improvement in coating durability under severe conditions . . . and application costs have been materially reduced. Some interior surfaces have *Epon primer as their only finish.*

If you need a protective finish like this in your paint program, ask your supplier for Epon resin-based paints and enamels. Write to Shell Chemical for the brochure "Planning to Paint a Pyramid?" on the variety of applications of Epon resins in surface coatings. Call on our sales offices for names of manufacturers who sell Epon resin coatings.

SHELL CHEMICAL CORPORATION

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ENGINEERED METAL CLEANING EQUIPMENT

In Canada Phillips equipment is manufactured under license by Williams Tool Corp. of Canada, Ltd., Brantford, Ont.

ing, which he calls "D-Chrome."* He does not believe that this new process will replace the two currently used types of chromium plating (bright chromium, and hard chromium); but rather, that it will supplement them because of its own distinctive features. He claims that successful chromium plating can be accomplished with D-Chrome in many cases where standard baths cannot be used. On the other hand, the D-Chrome deposit must be polished to obtain a bright coating, and its hardness is somewhat less than that of hard chromium.

The D-Chrome bath can be characterized as a tetrachromate bath, a type which has been known for a long time. However, a recent improvement introduced by K. Stolz has met with sufficient success that, in the author's opinion, the D-Chrome procedure now has a definite place in chromium plating technique.

The essential features of D-Chrome plating are:

1. Operating Conditions: temperature, 70 deg. F.; current density, 500 amp./sq. ft. and higher, with use of an interrupted current.
2. Properties of the Bath: rapid deposition, better throwing power than the standard bath, and a

*Kutzelnigg does not give the composition of the D-Chrome bath. The tetrachromate, or Bornhauser bath is based on the formation of sodium tetrachromate, $Na_2O \cdot 4CrO_3$, by addition of sodium hydroxide to the chromic acid bath. The following is a formula which has been recommended for this type of bath: CrO_3, 400 g/l; NaOH, 58 g/l; H_2SO_4, 0.75 g/l.—S.S.

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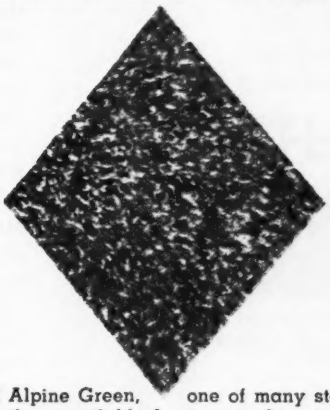

PLEXTONE Alpine Green, one of many standard pre-mixed colors available for prompt shipment. Also available in solid colors and in custom multicolors.

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current efficiency of 37 per cent.

3. Properties of the Deposits: grey matte chromium deposits which can be polished to a high luster, lower porosity than bright chromium, sufficient ductility to permit articles to be formed from chromium plated sheet.

The most important applications for which D-Chrome is said to be particularly suitable are:

1. Direct chromium plating of cast brass. A layer of D-Chrome, 4 to 5 microns thick, obtained in 4 to 6 minutes of plating, is said to afford good corrosion protection in contrast to the poor protective value of bright chromium when plated directly on brass.
2. Chromium plating of iron and zinc over an intermediate layer of copper. A layer of D-Chrome, 4 to 6 microns thick, applied directly over the copper, is said to give good corrosion protection without a final coat of lacquer. No special procedures are required for depositing D-Chrome over copper.
3. Chromium plating of deeply recessed parts. Because of the good throwing power claimed for D-Chrome, deeply recessed parts which can be completely covered with D-Chrome cannot

to page 86→

Photomicrograph of Keykoted panel enlarged 160 diameters. Send for Bulletin 135 which describes advantages and economies of Keykote.

for superior paint adherence on low carbon steels,

specify...

KELITE

KEYKOTE 25

U.S. Patent No. 2,557,509

Kelite Keykote 25 is a stable dry powder. In a water solution, it forms a Ferromolybdate Coating with these features:

1. **low cost,**
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Keykote may be applied by spray process, or by immersion using ordinary black iron equipment. Keykote meets all requirements for Grade 1 coatings, JAN-C-490.

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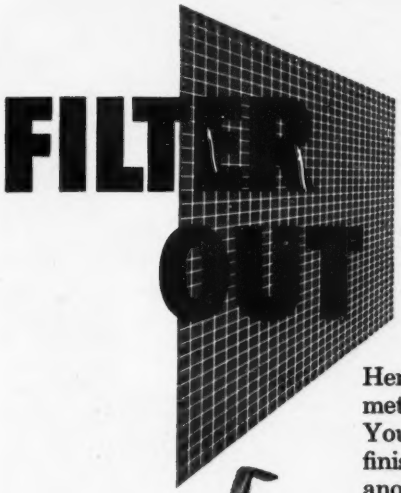
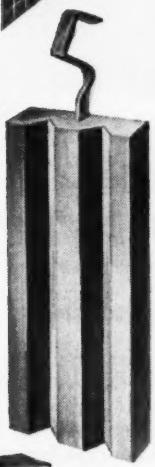


anode metal losses!

Here's a tip on how to save anode metal: *Keep your plating bath clean.* You'll have fewer rejects . . . better finish . . . longer mileage out of every anode.



Start CLEAN . . . Stay CLEAN

. . . by using Red Label Darco® S-51 regularly. It's the activated carbon especially made for taking harmful impurities out of plating baths. It wets quickly; it's easy to make up into slurries.

Get Red Label Darco S-51 from your local supplier. He has it in convenient 10-lb. and 50-lb. cartons. Be sure to ask for it by name!

Write for a copy of the article "Filter Out Your Plating Rejects", by Ezra A. Blount

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be so covered with ordinary chromium plating. It is pointed out that a brass cathode in the Hull cell is completely covered with D-Chrome except for 1 cm. on the low current density end when the cell is operated at 5 amperes.

4. Direct chromium plating of iron, zinc, and aluminum is considered to be feasible for parts to be used indoors.
5. Chromium plating of stainless steel by this method has been successful.
6. Special problems, such as the chromium plating of soft-soldered parts, special alloys, graphite, and so on, have been solved by the use of D-Chrome.

The author cites two types of test which demonstrate the corrosion resistance of D-Chrome plates. In a Ferroxyl test (etching solution —30 g NaCl and 10 g $K_3Fe(CN)_6$ per liter) on D-Chrome layers of 2, 4, and 8 microns thickness, very few pores were observed in the 4-micron plate and none at all in the 8-micron coating. On immersion in distilled water, coatings from 2 to 32 microns in thickness showed no rust after 11 hours. Even after three weeks in distilled water, the rust which developed on a cut edge remained practically unchanged.

The author reports in detail an interesting study of the structure of deposits of bright chromium, hard chromium, and D-Chrome. The usual metallographic technique using a light microscope fails to show any structure in a chromium deposit, other than its crack-pattern. The author, however, used an electron microscope, and with it he was able

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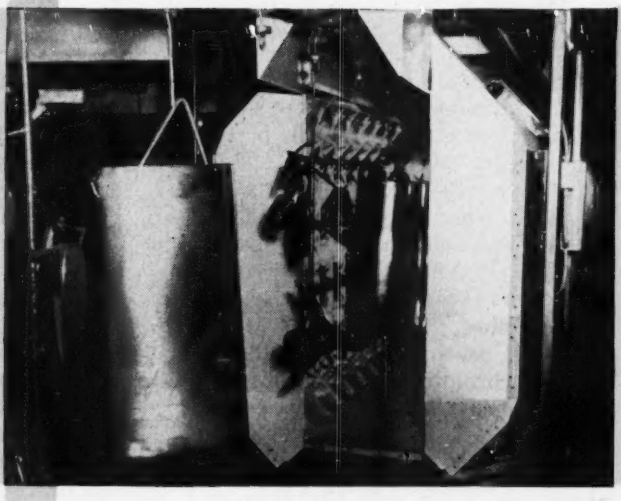
TYPICAL OF OVER 7,000 INSTALLATIONS—Pictured here is Fostoria oven at International Harvester Co., Richmond, Ind. Baking cycle for maroon color finish on cream separator parts is 11 minutes. Connected load 30 K. W. Oven is only 11 ft. long replacing old convection oven that occupied 480 sq. ft. with 1 hour baking cycle.



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Write for this brochure of technical facts and case histories of many Fostoria oven installations. Tell us your particular problem and we will include data directly applicable to your operation.

INFRA-RED fostoria OVENS

to resolve the structure of the D-Chrome deposits.

The following is a summary of his most important observations:

1. At very short plating times, a uniform chromium layer is formed, the structure of which cannot be resolved into single crystal grains. This initial layer corresponds to the bright plates that are obtained from the D-Chrome bath when very short plating times are used.
2. Above this primary layer, a layer in which discrete crystallites can just be detected is deposited. The crystallites are observed to form first along polishing scratches.
3. With continued plating, the entire chromium layer is observed to consist of randomly ordered crystal aggregates, among which are voids and holes. The grey color of the deposit is due to this structure and not, as has been suggested, to a superficial grey film. The crystal type could not be established unambiguously from this work, but the author believes it to be cubic.
4. The crystals are larger in the middle of the panels than at the ends, which indicates that current density has an effect on crystal size.
5. The crystal aggregates increase in size with increased plating time.
6. Examination of samples before and after polishing of the chromium yields evidence, which the author considers as conclusive, that the chromium flows under the polishing wheel. As a result of this effect, most of the voids and cracks that are observed in the unpolished sample are seen to have been filled up. The author agrees that it is surprising to observe flow in a metal with so high a melting point as chromium. Kutzelnigg suggests that this may explain the apparent anomaly that has been observed; namely, it is more difficult to polish a sample to full brightness if it has been previously electropolished than is the case with a sample in the as-plated condition. The author believes that the small grains that are removed during electropolishing are precisely the ones that are most subject to flow when they are present, and thus most effective in filling up valleys to form a uniform lustrous surface.

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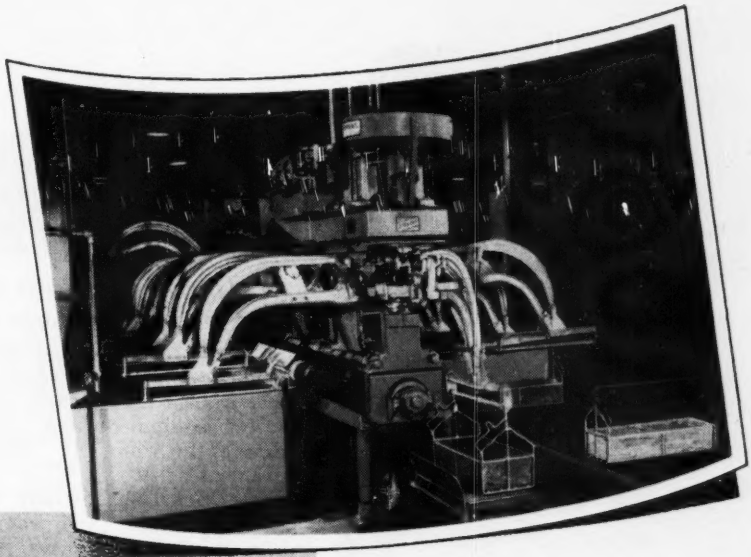

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STEVENS AUTOMATIC PROCESSING MACHINE CHANGES REQUIRED CYCLES FOR THESE TWO METALS IN SECONDS . . . .

Harvey Metal Corporation, Chicago, Illinois, are now Bright Dipping many thousands of aluminum and brass forged parts each day. A Stevens Automatic does the job. Result: Production is up . . . appearance is up . . . costs are down.

Mr. James R. Anderson, Jr., president of Harvey Metal Corporation, writes: "It is safe to say that with the Stevens machine we have cut in half the cost of acid and caustic dipping of brass and aluminum forgings."

Customers' reports of on-the-job results from many other companies using Stevens machines echo Mr. Anderson's comments. A list of these customers is a veritable "Blue Book" of American industry.

The versatility of the Stevens equipment is amazing. Delayed set-down and skip bracket features provide for timing and selectivity in the treatment of different metals in one machine. When automatic loader and unloader attachments are added, only one man is required for the operation. Here is truly automatic finishing at its finest.

If you are interested in cutting costs and increasing production in your metal finishing operations, call your Stevens Sales Engineer for a thorough analysis of your processing needs. Or write direct to Frederic B. Stevens, Inc., Detroit 16, Michigan.

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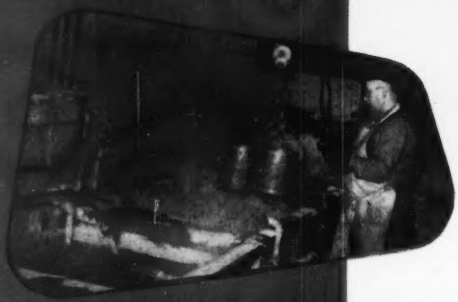
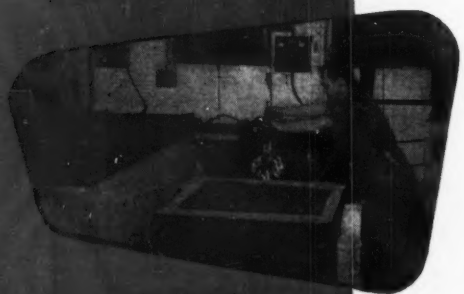




New EQUIPMENT MATERIALS PROCESSES

"Wabrite" Bright Nickel Process

A new bright nickel process has been developed by Wagner Brothers, Inc., Detroit manufacturer of electroplating equipment and supplies, according to John D. Tebben, vice president.

The nickel brightening process is called "Wabrite" and was developed as a result of extensive research at Wagner Brothers' laboratory, working in close collaboration with the research staff of a well-known Midwestern university.

Wabrite allows extremely high tolerances for impurities without impairing the quality of finish. Leveling, hiding and ductility of Wabrite are unmatched by any known process. Excellent throwing power (up to 100 amp/sq. ft.) permits uniform plate deposition into recesses. In addition, Wabrite furnishes a highly active nickel deposit ideal for subsequent chrome plating. Conversion of present baths to Wabrite is easily accomplished without loss of nickel bath or primary brightener.

For further data circle No. 1 on Reader Service Card inside back cover.

Leaded Zinc Oxide

A new type of leaded zinc oxide which is more efficient in paints than regular leaded zinc oxide is being offered by the Pigment, Color and Chemical Division of the Sherwin-Williams Company. The new product, known as "Ozlo 18M," is a co-fumed leaded zinc oxide composed of 82 per

cent zinc oxide and 18 per cent monobasic lead sulfate. It is more efficient than the regular leaded zinc oxides because it contains a higher percentage of the lead in an active or basic form. Controlled reactivity is obtained by co-fuming the lead and zinc into a unit pigment so that each metal acts as a blocking agent for the other, giving controlled formation of metal soaps and the optimum ratio of lead soaps to zinc soaps in the paint film.

Theory, backed by experimental evidence, shows that four pounds of Ozlo 18M may be used to replace five pounds of regular 35 per cent leaded zinc oxide while still retaining equal zinc oxide and equal effective lead content.

Literature describing the use of Ozlo 18M and samples of the material are available from the Pigment, Color and Chemical Division of the Sherwin-Williams Company, 300 West Lake Street, Chicago 6, or 100 Park Avenue, New York 17, New York.

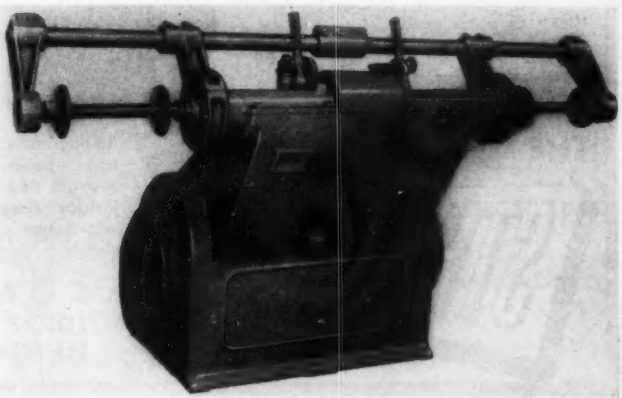
For further data circle No. 2 on Card inside back cover.

Wide Swing Polishing and Buffing Lathe

Manufacturer: Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

Special Model RRO Wide Swing Polishing and Buffing Lathe, a two-spindle lathe, each spindle having its own motor, motor control and V-belt drive allowing each operator to change wheels without interferring with or causing down time for the other, has been announced by Hammond Machinery Builders, Inc. Heavy duty construction and rigidity of the outboard bearing permits the use of wheels up to 16 inches face on each spindle.

Stated to be especially suited for polishing and buffing of large and irregular shaped parts, either by hand



Model RRO Polishing and Buffing Lathe.

polishing or in conjunction with semi-automatics, further information on the lathe is available from the manufacturer, or by circling No. 3 on Card inside back cover.

Paint Stripping Agents

Paint manufacturers today work hard to develop new paint formulations that will wear better and last longer; yet these chemically resistant paints are not readily accepted for high production items. The main reason is that, up to now, there has not been a satisfactory and economical method of stripping these paints from rejected parts and work hangers.

Well aware of this problem, the Whitfield Chemical Company of Detroit has developed a complete line of water soluble stripping agents called Alka-Strip, specifically designed to meet some of the new paint formulation requirements.

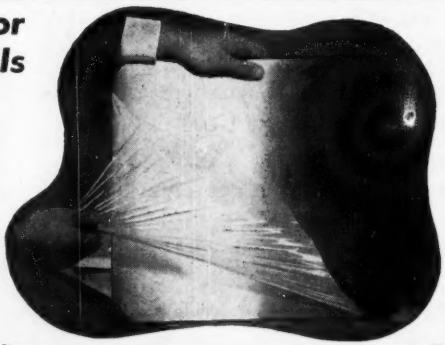
One material in the Alka-Strip line has been on the market for several years and has found general acceptance. Its application was for air dry or baked synthetics and enamels.

Now five more materials have been added to the Alka-Strip line. All are fast acting, water soluble, non-flammable, non-toxic, non-evaporative, and extremely versatile.

Usually alkaline strippers are applied in hand operated dip tanks but with Alka-Strip, continuous conveyorized or mechanized stripping applications are possible. In one plant all hook stripping is done this way. Rejected parts may be left on and stripped along with the hooks. Alka-Strip's fast action makes this possible. It di-

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust. Also available as a booth coat protection.



THE STRIPLASTIC COMPANY

Among many advantages, it is non-toxic, possesses great tensile strength and is easily stripped off in one piece. Write for complete information on this new strippable plastic.

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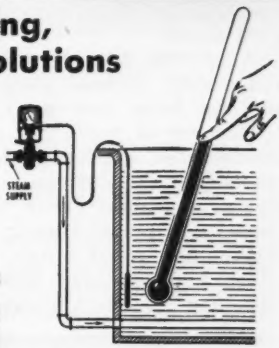

POWERS No. 11-MF Regulators insure most effective use from various solutions by holding them at the right temperature automatically. They save Steam and Labor.

Plastic Thermal Bulb and Tubing is highly resistant to solutions used in above processes. Prevents electrical shorts. No insulators required for the regulator.

Easy to Read 4" Dial Thermometer indicates temperature of liquid being controlled and makes it easy to adjust regulator for different temperatures.

Bulletin 330 fully describes this simple, self-operating regulator. May we send you a copy? (b30)

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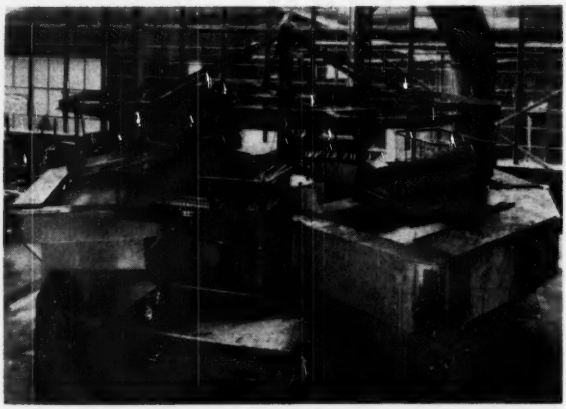

Alka-Strip reduces stripping time to a matter of seconds on a finish that formerly required 30 minutes to remove. Fast action made possible the use of mechanized equipment and immediate return of rejected parts to production.

gests and disintegrates the paint in the stripping action, leaving no paint residue which cannot be rinsed with water.

Alka-Strip is available in six grades: Reglar, 9X, 10X, 200, 400, and 600, to be specified for the particular application. Depending upon the job, some of the Alka-Strips could be recommended for use in combination with caustic or solvent type stripping agents.

Alka-Strip may be used on steel, magnesium, chrome plated zinc base die cast, brass, and cast iron.

Removal of pigmented primers, enamels, paint, synthetic resins, and lacquers from the above metals is done in heated solutions. Other possible uses include stripping interior surfaces of water-wash paint spray booths and pipes, and collecting, floating or conditioning of paint overspray. Alka-Strip has even been used for the removal of oil, chips, metallic oxides, and abrasives from metal parts. In water-wash dust collectors Alka-Strip is used for precipitating and "wetting out" the dust sludge.

For further data circle No. 4 on Reader Service Card inside back cover.

Automatic Precision Industrial Washing Machine

The development of an automatic indexing fixture type, three-stage precision industrial washing machine has been announced by the International Conveyor and Washer Corp., 652 E. Fort St., Detroit 26, Michigan.

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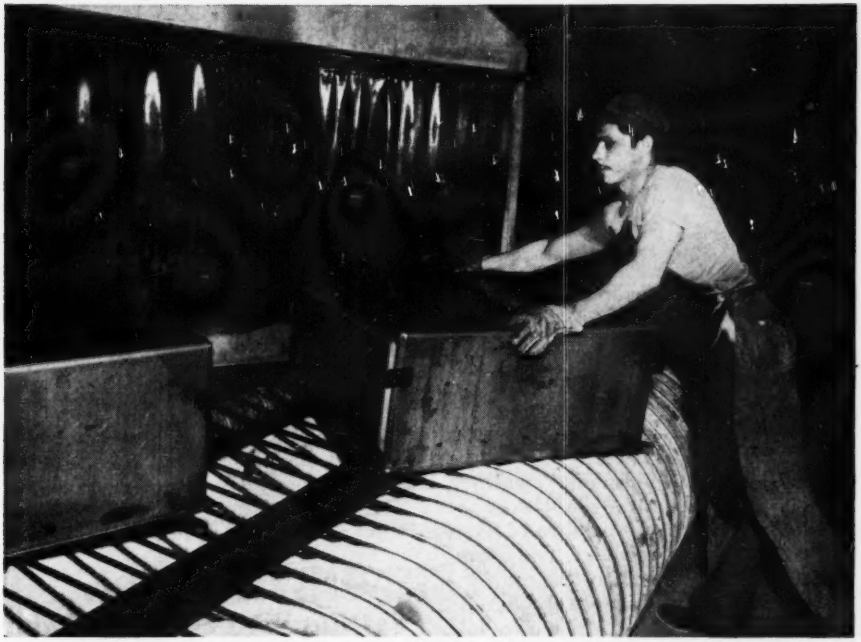


Deep-drawn refrigerator liners entering spray machine at Hotpoint for pre-porcelain cleaning. Other than plant grime, soil present is a wet-type drawing lubricant, alkali resistant and difficult to remove. If not thoroughly removed, however, it causes defects in the porcelain coating.

CLEANING REJECTS VANISH WHEN HOTPOINT TEAMS UP PENNSALT CLEANERS

Normally, Hotpoint uses drawing lubricants that are easily removed. But the draw on these liners and vegetable pans was quite severe, requiring a hard-to-remove, alkali-resisting lubricating compound. Their usual cleaner did not remove all the soil. The residues interfered with coating quality.

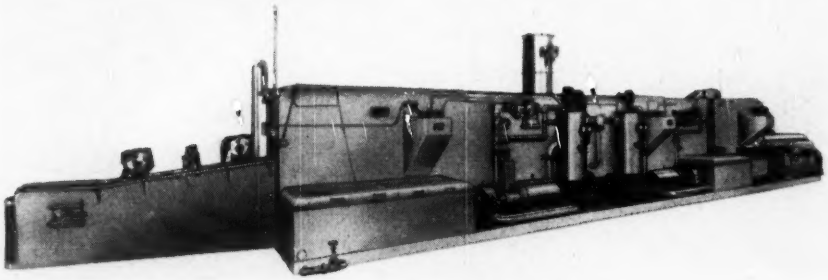
Hotpoint called in the Pennsalt Field Service Representative. He recommended two cleaners; Pennsalt Cleaner EC-54 for the pre-cleaning spray, Pennsalt Cleaner #30 for the main spray. They efficiently and economically removed all soils, and defects vanished.

PENNSALT manufactures a complete line of fast-acting, low-cost metal cleaners for plating, porcelain enameling, painting and phosphatizing operations. Pennsalt Metal Processing Specialists will help you select and use those best suited for your plant needs.

For further information call or write: Metal Processing Dept., Pennsylvania Salt Manufacturing Co., 821 Widener Building, Philadelphia 7, Pa. *West:* 2168 Shattuck Ave., Berkeley 4, Calif.

Pennsalt Chemicals

"A BETTER START FOR YOUR FINISH"



Automatic Precision Industrial Washing Machine

According to company engineers, this International Washer was designed on the "pin-point" washing principle; opposed to the theory of metal cleaning by the passage of parts through volume washes. The "pin-point" washing action in this machine is achieved through precisely located high pressure nozzles which are said to clean and flush each passage; blind, tapped hole and cavity externally and internally.

Among the many automatic features claimed for this International Washer is its electrically sequenced, hydraulically powered transfer mechanism. A hydraulic indexing drive is said to index the fixtures into exact position for precision cleaning. The drive then locks the transfer mechanism into absolute immobility, securing fixture in this position for an exact interval until the casting is ready for the next cleaning stage. Literature available.

For further data circle No. 5 on Reader Service Card inside back cover.

Settling and Filtering Unit

A Settling and Filtering Unit designed primarily for the filtration of relatively small solids permits continuous removal of chips, heavy solids and relatively fine solids to 0.004 inch screening. This unit is made for the filtration of liquids of varying degrees of viscosity containing solids of different particle sizes and widely differing weights. The size of the unit is dependent upon the settling rate which is governed by the gravity of the so-

POCKET **HANDI-GAGE**

A MAGNETIC THICKNESS TESTER

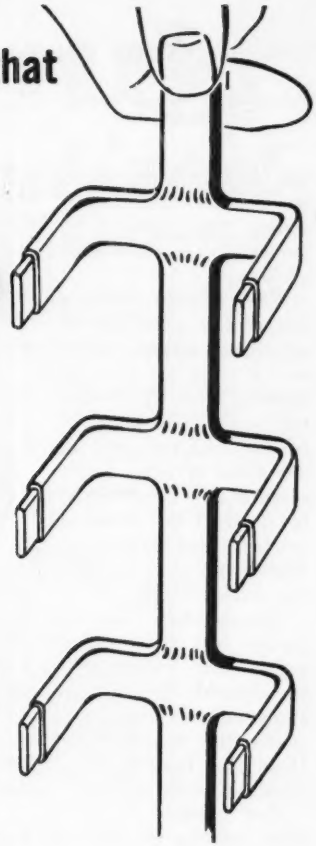
for electrodeposited, hot-dipped and painted coatings on steel. No bigger than a fountain pen, but what a job it does! Tests plated, painted, enameled, or plastic laminated coatings in SECONDS—in the lab or on the production line. Accurate, quick and easy to use.

Platers Research CORPORATION

59 EAST 4TH STREET — NEW YORK 3, N. Y.

Be sure of rack protection that

STICKS TIGHT



through all cycles

...use COATING 218X

USERS of Unichrome Coating 218X know that in Unichrome Primer 219PX they're getting the outstanding *single coat primer* developed. It not only saves time and work, but also assures maximum benefits from the remarkable properties of Coating 218X.

Anchored to this primer, Coating 218X takes hard use – even abuse. It defies all plating and cleaning cycles without blistering, or lifting at contacts. It won't crack, chip or tear. It even resists vapor degreasing cycles.

Remember, Coating 218X is produced by United Chromium . . . the company that has: (1) Developed plating processes; (2) Given service on plating problems; (3) Pioneered highly corrosion-resistant plastisol coatings . . . and therefore knows what a rack coating needs for maximum plating service.

UNICHROME Trade Mark **COATINGS for METALS**

Products of UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N.Y. • Detroit 20, Mich. • Waterbury 20, Conn. • Chicago 4, Ill.
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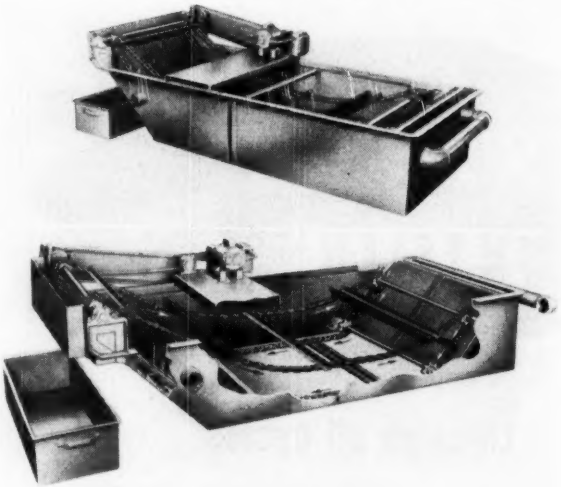
Two views of Delpark Settling and Filtering Unit



lids and the viscosity of the liquids which determines the retention period for a given rate of flow.

The system makes use of the principle of expelling settled solids with chain driven flights. This principle reduces the volume of solids to be removed by the filter screen. Filter screens are continuously cleaned by brushes which also serve as flights and aid in removing settled solids.

Special bar type screens with accurate slot sizes provide for filtering solids that remain in suspension as the liquid flows toward the outlet. Especially designed for easy cleaning while the machine is in operation, they are furnished in slot sizes as small as 0.004 inch.

For further information, write for new bulletin to George L. Guymon, vice president, Industrial Filtration Company, Dept. S-312, Lebanon, Indana, or circle No. 6 on Reader Service Card inside back cover.

Barrel Finishing Compounds

Almco Supersheen, Albert Lea, Minnesota, manufacturer of Almco Supersheen Deburring and Finishing Equipment, materials and compounds, has announced two newly perfected compounds.

Filling a long felt need is Almco Supersheen compound No. 58. This Almco product is a coarse, heavy duty, long life abrasive grinding compound for heavy deburring and grinding operations. It can be used on all metals, but recommended for ferrous parts.

CORROSION-PROOF LININGS CEMENTS BRICK

• TANKS, FLOORS, FUME DUCTS AND PROCESS EQUIPMENT
• COMPLETE LINE OF PROTECTIVE COATINGS . .

Over a Quarter Century of Experience

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Weigh your purchase carefully before you buy

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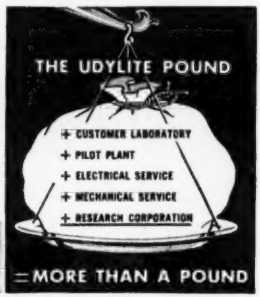
BUY UDYLITE
PLATING SUPPLIES

THE Udylite CORPORATION



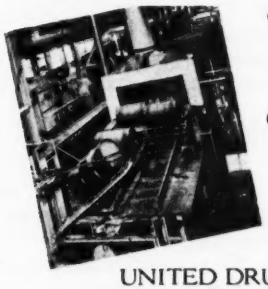
UNITED

STEEL DRUMS ARE *Granodized*

WITH GRANODINE®

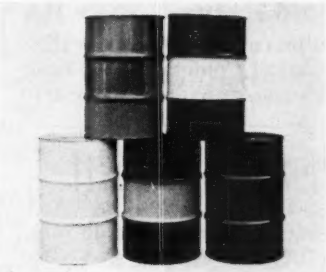
FOR EXTRA PROTECTION

Steel Drums made by United Steel Barrel Company of Philadelphia, Pennsylvania, are chemically cleaned and phosphate coated in an integrated spray Granodizing Process:



- **ALKALI CLEANING** removes oil, grease, fingerprints, hand-marks, other surface soil;
- **SULFURIC ACID PICKLING** then removes mill scale;
- **GRANODIZING** converts the chemically cleaned steel surface to a uniform phosphate coating. The "Granodine" coating being non-metallic is an ideal bond into which the paint finish is "keyed" or anchored;
- **"DEOXYLYTE" final acidulated rinsing** conditions the Granodized steel surface for optimum paint life.

UNITED DRUMS fabricated from Standard Gauge Steel are available in all sizes, with special linings for a variety of products, and decorated with any desired design.



- **EXTRA PROTECTION** for the finish—a lasting bond between paint and steel.
- **EXTRA PROTECTION** for the steel container—an inert barrier against rust creepage.
- **EXTRA PROTECTION** for the contents—chemically clean interior surfaces.
- **EXTRA PROTECTION** for the customer—an assurance of cleanliness, durability, and fine appearance.

Pioneering Research and Development Since 1914

AMERICAN CHEMICAL PAINT COMPANY

CHEMICALS ACP PROCESSES

General Offices: Ambler, Penna.

Detroit, Michigan *Niles, California* *Windsor, Ontario*

CHEMICALS ACP PROCESSES

It was developed as a non-foaming compound for use in long runs where heavy foam may develop and deter the grinding function.

In addition to Compound No. 58 Almco Supersheen has also announced Compound No. 41 — an economical compound for use with all metals, but especially designed for burnishing of brass, zinc, aluminum and copper.

For complete data on Almco Supersheen Compounds and equipment, write to Almco Supersheen, Albert Lea, Minnesota, or circle No. 7 on Reader Service Card inside back cover.

Ball Bearing Washing Machine

The Equipment Division of the Magnus Chemical Company, Inc., has added the Magnus Cabinet Ball Bearing Washing Machine, Model RT to its line of ball, roller and needle bearing washing machines.

*Magnus Cabinet Ball Bearing Washing Machine, Model RT

The Model RT is of the batch type with loading and unloading at the same location and consists of a cabinet, spray system, pumps, solution tank, rotating cones, and filtering system. The washing and rinsing operations are performed at the same time inside the cabinet using the same spray system.

Specially designed cones complete with removable extension spindles are installed inside the cabinet.

When fully loaded the machine

FUNCTIONAL FINISHES!!

If you require your coatings to accomplish some specific task — something beyond mere ornamental appearance or average longevity —

Try Us!

We make ACRYLIC, ALKYD, CELLULOSIC and VINYLOID coatings for a very wide range of specialized industrial applications.

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Cleveland, Ohio

It makes a lot of cents to buy the most for your dollars

BUY WISELY
BUY UDYLITE
PLATING SUPPLIES

THE Udylite CORPORATION

THE UDYLITE POUND
+ CUSTOMER LABORATORY
+ PILOT PLANT
+ ELECTRICAL SERVICE
+ MECHANICAL SERVICE
+ RESEARCH CORPORATION
=MORE THAN A POUND

Come to TUMBLE GRAV-I-FLO FINISH

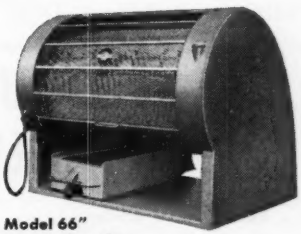
. . . For Higher Lustre — Smoother Finish On Metal Parts

Get a superior finish on metal parts with Super-Brite chips and compounds employed in the Grav-i-Flo Tumbling Process. These materials cut faster, eliminate need of transferring parts between roughing and finishing, and end subsequent operations such as ball burnishing.

Grav-i-Flo cuts direct labor costs, too. Hundreds of companies are getting better finishing and deburring results, faster and cheaper. Check these advantages to improve your competitive position today!

Grav-i-Flo Offers Complete Equipment and Supplies For All Your Tumbling Needs!

Machines—5 sizes—66", 48", 36", 32" and 24". Cam locked doors with safety stop; unlined or rubber lined; constant or variable speed; J.I.C. controls; timers 5 min. to 20 hrs.; electric wiring and water piping.



Model 66"
Two compartments

Compounds—Natural and synthetic deburring and finishing chips and highly developed compounds outperform every type of tumbling process offered.

Accessories — Separator and chip grader, hoist pans, chip pans, washout doors, screens, chip bins, unloading boots, dip tanks.

Investigate — Our representative will visit your plant; or send samples direct to us. Engineering Service available to all users.

SEND FOR CATALOG showing complete line of Grav-i-Flo equipment, accessories and supplies.

GRAV-I-FLO CORPORATION, Department PF8, Sturgis, Michigan

☐ Please send complete catalog. ☐ Have Sales Engineer call. ☐ We are sending samples for free processing.

Company_____

Name_____ Position_____

City_____ State_____

THE GRAV-I-FLO CORPORATION 400 NORWOOD AVENUE STURGIS, MICHIGAN

holds four bearings. The bearings are placed on the cones or on the cone extensions (depending on the size of the bearings being processed).

By means of a Magnus engineered rotating system, the inner races of the bearings rotate 360 degrees in one direction and then through 360 degrees in the opposite direction. The outer race of the bearings does not rotate as it is held in a fixed position by a self adjusting spring loaded holding device.

All inner and outer surfaces of the bearings are uniformly and thoroughly cleaned with filtered cleaning solution through nozzles located above and below the bearings.

The Magnus Cabinet Ball Bearing Washing Machine, Model RT has a capacity of 500 bearings per day.

For information, write to Dept. PF, Equipment Division Magnus Chemical Company, Inc., Garwood, N. J., or circle No. 8 on Reader Service Card inside back cover.

Safety Friction Clutch

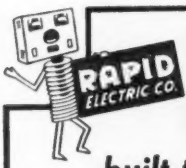
A Safety Friction Clutch has been developed and patented by Metalwash Machinery Corporation, Elizabeth, New Jersey.

Originally designed for use on all Metalwash washing, pickling, drying, and phosphatizing machines, the Metalwash Safety Friction Clutch has been so well received by washing machine customers that Metalwash has increased its production in recent years to supply other manufacturers.

Drive Sprocket A is bolted to Drum B. Complete assembly of Drum and Sprocket floats on Driven Shaft C. The Spider D is fastened to the shaft by means of a key.

Brake Shoes E are pivoted at one end to the spider. At the opposite end of each shoe, the Adjustment Clevis F holds the shoe in place and is guided by a hole in the spider. The shaft of this clevis is threaded and is equipped with a nut, washer and spring.

Power is transmitted through a roller chain to the sprocket through the brake shoes and the spider to the driven shaft.



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. . . built to your Specifications.

INDUSTRIAL AND LABORATORY USE.

- ELECTROPLATING
- ANODIZING
- PERIODIC REVERSERS
- CONTROLS

CATALOG AVAILABLE ON REQUEST.

RAPID ELECTRIC CO.
2877 MIDDLETOWN ROAD, N. Y. 61, N. Y.

MORSE
VERTICAL DRUM TRUCK

Picks up 55 gal. drums, rolls them over for side draining. Becomes a rugged stand on 3" wheels.

MORSE MFG. CO., INC. 762 W. Manlius St. East Syracuse, N.Y.

New Black Magic plus Magic Mist

gives a Wear Resistant, Low Friction, Solid Lubrication coating to all parts subjected to wear.

For Example:

It has been reported that an ordinary carbon tap treated by this process was equal or better in performance to a chromium plated high speed tool tap which cost three times as much.

Manufacturers have been reporting 20 to 500% increase in the life of drills and reamers when treated with Magic Mist.

Case histories prove better lubrication qualities and longer life for all machinery parts processed with Black Magic plus Magic Mist.

This is an economical dip process that is designed to do production work in a matter of minutes. The added wear resistance, low friction and solid metallic lubrication obtained is a must for all manufacturers of moving parts.

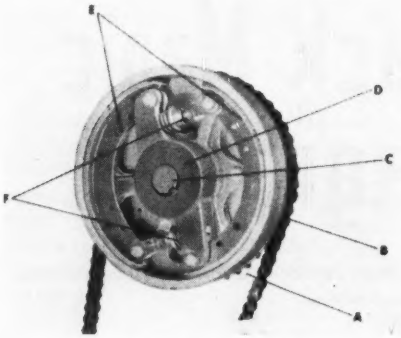
If it moves—it needs Black Magic and Magic Mist.

LET US FINISH YOUR PARTS SO THAT You Can Test and Evaluate this Process

Mitchell-Bradford

THE MITCHELL-BRADFORD CHEMICAL CO.
2446 MAIN ST. STRATFORD, CONNECTICUT

QUALITY PRODUCTS OF CHEMICAL RESEARCH

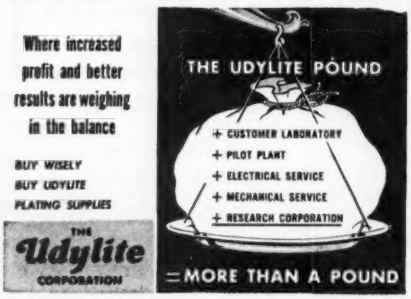


Safety Friction Clutch

A slight adjustment of the nuts on the adjustment clevises gives sufficient pressure against the Drum to carry extremely heavy loads. Regardless of the load, however, the slightest overload will cause the clutch to slip until the obstruction is removed. For further data circle No. 9 on Reader Service Card inside back cover.

Oil and Moisture Separator

An oil and moisture separator for cleaning of compressed air is the newest product in the DeVilbiss Company's line of spray painting and allied compressed air equipment. The unit is available with or without a regulating device.



The new unit, designated P-HLE, is a high capacity 50 c.f.m. unit with power regulation assuring steady uniform air delivery. If regulation of air is not desired, DeVilbiss sells the oil and moisture separator alone and this carries the designation, HRE-501.

The combination unit, embodying separator and regulator, will regulate pressures up to 135 p.s.i. from an air line carrying pressures up to 250 p.s.i. The unit has a length of 15 inches, is 8½ inches wide when equipped with

The new DeVilbiss Company oil and moisture separator complete with pressure regulation equipment is shown. The operator is opening the simple drain valve at the base of the unit to remove trapped oil and water.

valves and has a depth of 8½ inches.

The oil and moisture separating unit has a centrifugal type oil and water eliminator which is all metal and does not require replacement or maintenance. The filter is a permanent type which has long life and is easily removed for cleaning. The filter chamber is drained by a simple valve at the bottom of the unit. The oil and moisture separator can be installed in air lines supplying pneumatic tools

AUTOMATIC REGULATION is in top section of plating power supply. Operator sets desired voltage level on control station near tank, and automatic regulation maintains his setting.

Automatic Regulation on G-E Plating Power Supplies Increases Productivity and Reduces Costly Rejects

Once you have set the voltage or current on an automatically regulated General Electric Plating Power Supply, no further adjustments are needed. Automatic regulation maintains your setting within ±2 per cent, regardless of variations in line voltage or tank load. Equipment is available to automatically regulate voltage or current, or both.

SAVINGS—Automatic regulation saves you money several ways. There is no need to check and adjust current or voltage. By eliminating human error, it assures work of more uniform quality. It facilitates continuous production without expensive shutdowns for maintenance or adjustments. Finally, it greatly reduces rejects caused by current or voltage variations.

FLEXIBLE—Automatic regulation will maintain any setting between 16 and 100 per cent of rated voltage, or 10 and 100 per cent of rated current. It is available as an integral part of G-E plating power supplies, or can be added later to manually controlled units.

MORE INFORMATION is available from any authorized G-E agent, or by writing Sect. 464–15E, General Electric Company, Schenectady 5, N. Y.

BARREL PLATERS

Economical, 12-volt barrel platers are available in ratings from 500 to 2000 amperes. Your nearest agent has full information.

Progress Is Our Most Important Product

GENERAL ELECTRIC

or other units requiring clean compressed air for operation.

Additional information and literature may be obtained by writing to the DeVilbiss Company, 300 Phillips Ave., Toledo 1, Ohio, or by circling No. 10 on Reader Service Card inside back cover.

Insulating Bushing

A Nylon insulating drive shaft bushing is being installed on all new type OLS Daniels plating barrels, according to the manufacturer, Daniels Plating Barrel & Supply Co., Newark, N. J.

Designed to add even greater refinements to the Daniels OLS plating barrels, the bushing (illustrated in the inset of photo) is made of nylon and slipped over the solid brass drive shaft.

This insulating bushing provides a strong wearing surface for the drive gear and completely insulates the driving assembly. Its outstanding advantage is that it permits all the DC power to go directly to the plating parts and reduces the possibility of stray currents. Also, it reduces gear wear.

Complete information is available from Daniels Plating Barrel & Supply Co., 129 Oliver Street, Newark 5, N. J., or circle No. 11 on Reader Service Card inside back cover.

Daniels OLS Plating Barrel equipped with Nylon Insulating Bushing

McKeon's "Liquid Sulphur"

Most economical, most satisfactory method of

STRIPPING COPPER.

Brochure on request.

Sulphur Products Co., Inc.

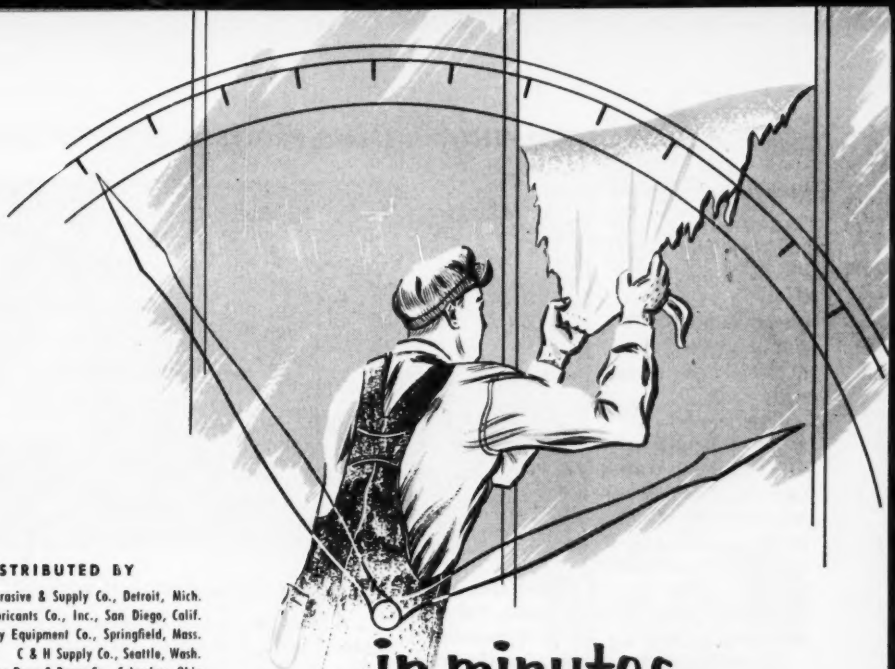
228 McKEON WAY GREENSBURG 6, PA.

Air-Flow Drying Tunnel Kit

Air-Flow Drying Tunnel Kits incorporating Chromalox electric far-infrared heaters, are available from Edwin L. Wiegand Co., Pittsburgh, Pa. The kits offer quick assembly of far-infrared tunnels for improved screen process drying.

In addition to simplifying and speeding initial installation, the kit offers advantages of rapid, controlled drying, saving of floor space and reduction of production costs.

Two models are available to suit the most frequent production needs of the screen process industry. With each, belt speeds from 5.6 to 23.4 feet per minute can be obtained and intensity of the all-metal heaters can be easily varied from 4 to 100 per cent



in minutes... peel spray-booths clean

"LIQUID ENVELOPE"

The ORIGINAL Time-Tested Strip-Coating

It's the quick, labor-saving, safe way to keep booths firesafe, better illuminated, better ventilated.

"LIQUID ENVELOPE" is non-toxic . . . does not contain dangerous chlorinated solvent. It will not corrode metal walls or ventilating ducts. And it's flame proof and fireproof . . . dry film will not burn or support combustion.

Costs less than hand-scraping or grease-papering as hundreds of plants have proved to their complete satisfaction year after year.

NEW-USERS SAMPLE OFFER

5-gallon test-sample at the drum-lot price. Order now from nearest distributor—start saving soon.

BETTER FINISHES & COATINGS, INC.

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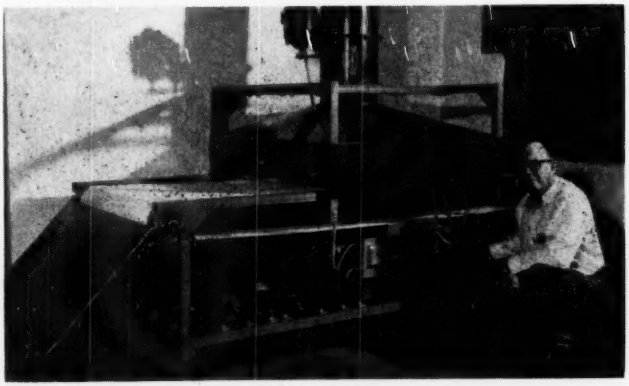
(Industrial Division)
Tanner and Co., Indianapolis, Ind.
Tri-State Spray Equipment & Compressor Co.,
Omaha, Neb.; Rock Island, Ill.
In Europe:
Jenson & Nicholson, Ltd., London, Eng.

Air-Flow Drying Tunnel



of their capacity. Each kit provides the component parts required to construct a tunnel with 36 inch wide belt.

One model has a hood length of 46 inches, distance between belt centers of 84 inches, and contains 3 radiant heaters rated at 2.5 kilowatts each; the other has a 70 inch hood, 108 inch belt length, and six 2.5 KW heaters.

In addition to parts already mentioned, kits contain Unistrut framing, variable speed transmission, drive motor, motor-driven fan, Chromalox heat control equipment, and all other accessory equipment required to construct a complete tunnel except the exhaust hood which most users will want to fashion according to their individual needs.

For more information about the Chromalox air-flow drying kit, write to Edwin L. Wiegand Co., 7552 Thomas Blvd., Pittsburgh 8, Pa., or circle No. 12 on Reader Service Card inside back cover.

Magnetic Tank Cleaner

A handy effective device to curtail shutdowns for tank cleaning is the Magic Clean-Out Tool, manufactured by the Standard Portable Cord Co., Inc., 1300 E. Second St., Jamestown, New York. The tool makes possible quick removal, by magnet, of ferrous metal objects from dip tanks, plating tanks, acid baths, heated bake ovens.

The tool consists of a permanent neoprene covered Alnico V magnet attached to a 48-inch wooden handle with die cast zinc clamps. The clamps are coated with Hysol 3801-B, which is used by the plating industry for coating racks and tanks.

After molding, the Tenite 2 (MH Grade) reflector shells are lacquer undercoated and placed in a CVC 48-inch horizontal coater (Model LC1-48A). In less than half an hour, they are metallized and ready for another coating of lacquer. All CVC vacuum coating units come with all necessary controls, are easy to operate, require little maintenance.

a CVC vacuum coater puts the gleam on a butyrate flash reflector

Most plastics are easy to vacuum metallize. But not all grades of butyrate.

Yet, just recently Eastman Kodak Company set up production of a vacuum metallized butyrate flash reflector using *CVC* equipment. This new development was made possible by using *CVC*'s technical knowledge and practical experience in the development program. The result is a reflector with higher reflectivity and better appearance than previous metal models. And, the coating will withstand all normal handling.

CVC's experience in high vacuum metallizing and associated lacquering operations is available to help solve your problems. And *CVC* is ready to help you get started in this rapidly growing business with the most efficient vacuum metallization equipment available. For information on this or any other application of high vacuum, write to ***Consolidated Vacuum Corporation, Rochester 3, N. Y.*** (a subsidiary of Consolidated Engineering Corporation, Pasadena, California).

CVC

Consolidated Vacuum Corporation

ROCHESTER 3, N.Y.

Headquarters for High Vacuum

sales offices: NEW YORK, N. Y. • CHICAGO, ILL. • BOSTON, MASS. • CAMDEN, N. J. • PALO ALTO, CALIF.

The tool is available with 20, 30, or 45 pound lift magnets.

For further data circle No. 13 on Reader Service Card inside back cover.

Automatic Spray Machine

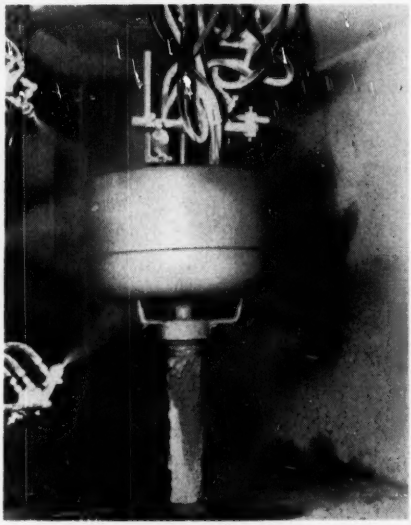
An automatically operated machine designed to spray 250 washing machine tubs per hour, has been announced by Ferro Corporation, Cleveland, Ohio.

Ferro claims this to be the only automatic spray machine in industry that can successfully be used on wash machine tubs.

It is now being used by Allianceware, Inc., and Heintz Manufacturing Company. Another, installed at the Maytag Company, Newton, Iowa, will be in operation shortly.

The automatic spray machine initiates a program devoted to reducing the cost of porcelain enamel application through eliminating labor and handling costs.

Equipment for automatically flow coating dish washer tubs has already been designed.



Automatic Spraying Machine for Wash Machine Tubs

For further information write Elmer Dany, Manager, Engineering Division, Ferro Corp., Cleveland, Ohio, or circle No. 14 on Reader Service Card inside back cover.

Zinc Phosphate Coating

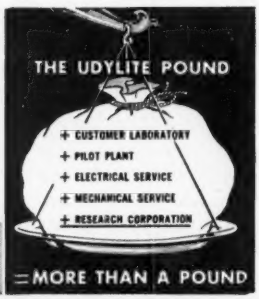
Cowles Chemical Company of Cleveland, Ohio, manufacturer of industrial chemicals, has announced a zinc phosphate coating, "Ty-Bond," which is now available to the metal finishing trade.

Ty-Bond is an amorphous zinc phosphate coating. Ty-Bond forms a

The Udylite pound carries a lot of weight

BUY WISELY
BUY UDYLITE
PLATING SUPPLIES

THE Udylite CORPORATION



For a real good polishing job use

Keystone TURKISH Emery

FRESH SUPPLY AVAILABLE

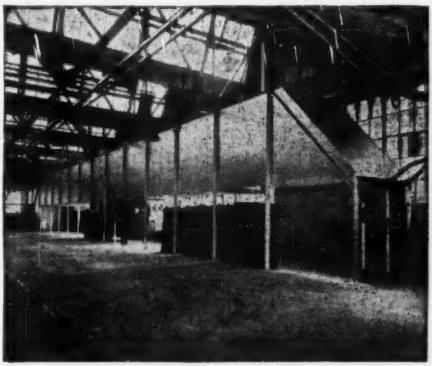
KEYSTONE EMERY MILLS — *Write for Sample* — 4316 Paul St., Phila., Pa.

A *LOT MORE* THAN FANS, DUCTS, HEATERS, AND PANELS

GO INTO

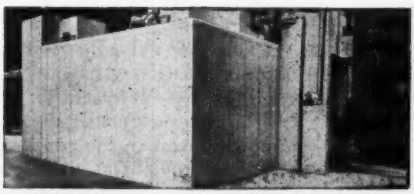
LANLY
FINISHING OVENS

● The proper adaptation and utilization of the essential component parts in every **LANLY OVEN** for maximum operating efficiency and economy, is a certainty being demonstrated every day in factories throughout the country. Specialized knowledge evolved from long experience and close cooperation with our customers enables us to design and erect better finishing ovens.

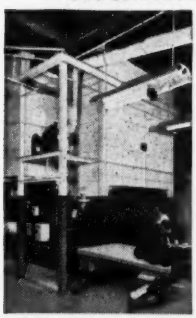


LANLY FINISHING OVEN Completely automatic LANLY A-Type Continuous Paint Baking Oven. Compact, built-in heating system affords rapid, uniform baking. Natural hot air seals at open ends. Space under oven can be utilized to advantage.

Two Continuous Laydown Dryers



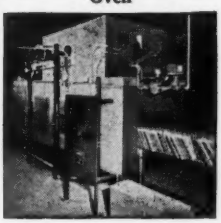
Three-Pass Oven with Air Seal Vestibules



Vertical Hollow Ware Dryer

Ceiling Suspended Continuous A-Type Paint Oven

Continuous Wicket Type Oven



Write for the NEW LANLY CATALOG

smooth, dense, and hard coating on the basic metals. Exceptionally adherent and durable, Ty-Bond coatings cannot be removed, cracked, or damaged by severe bending or flexing.

Compounded under new formulations, Ty-Bond coatings cause a chemical reaction on the metals being coated, integrating themselves with the metals to form a denser, harder coating for better, more complete rust-proofing. Ty-Bond coatings are non-sludging.

Cowles Ty-Bond amorphous zinc phosphate coatings are available in several different types to provide a wide range of coating weights. All government specifications can be met by Ty-Bond coatings.

For further data circle No. 15 on Reader Service Card inside back cover.

Corrosion Resistant Valves

Needle and globe valves made of Boltaron 6200 unplasticized polyvinyl-chloride are available in quantity for use with Boltaron pipe and fittings in solving plant corrosion problems, H. N. Hartwell and Son, Inc., Boston, has announced. Like Boltaron pipe and fittings, the new valves are available in standard I.P.S. sizes of ⅛, ¼, ⅜, ½, ¾, 1, 1½, 1¼, and 2 inches.

Boltaron, a Bolta-Hartwell product, has eliminated corrosion problems for many industries. It is already in use in the textile, steel, tanning, plating, dyeing and chemical industries.

Boltaron 6200 has shown outstanding chemical resistance to organic and inorganic acids, alkalies, alcohol and foodstuffs.

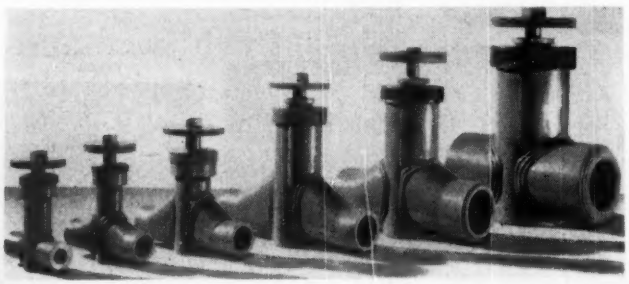
Through a nation-wide distribution setup of trained and licensed fabricators Boltaron 6200 is available for installation throughout the country.

For further data circle No. 16 on Reader Service Card inside back cover.

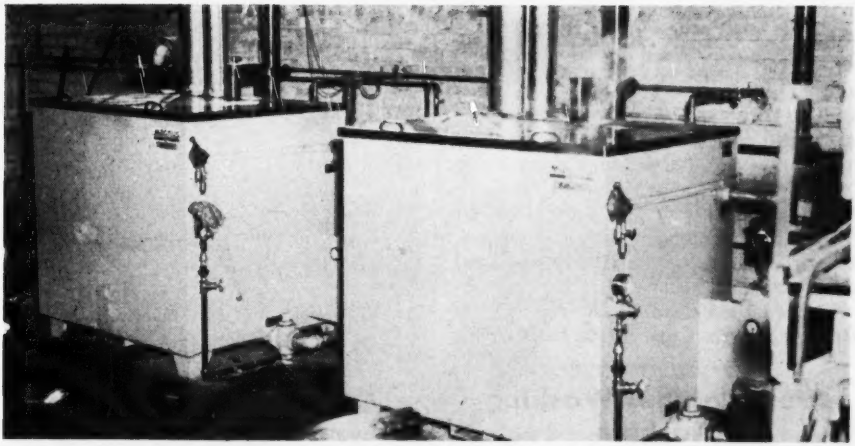
Titanium Porcelain Enamel

A new titanium frit for porcelain enamel which was developed specifically to meet the needs of the appliance industry in the manufacture of colored home appliances is in production by Ferro Corporation, Cleveland, Ohio, according to W. N. Noble, vice president of Ferro. Designated as Ferro's "1700" frit, the titanium enamel provides true color values, and its high stability results in strong resistance to fading or to color variance.

Developed particularly for the exacting color requirements of the home appliance industry, the "1700" frit is being produced by Ferro using its recently developed "flake" process. Under this method, sheets of nearly molten glass are cold rolled to produce a uniform flake frit, rather than the old process whereby the superheated glass was dipped into cold water to shatter it. The unusually high standards of



Boltaron 6200 Corrosion Resistant Valves



Check these Cleaning Results

of an eastern job plating shop

- ✓ Greatly improved results over vapor degreasing... resulting in better plating.
- ✓ Cost of cleaner reduced by 80%.
- ✓ Steel parts protected against rust up to two days.
- ✓ Elimination of hazardous vapors.
- ✓ Greater production through faster cleaning.
- ✓ Complete removal of metal chips from work.
- ✓ Low initial cost – low upkeep.

All these results are obtained with the Magnus Aja-Lif Method of cleaning. Write for details.

FOR THE DIFFICULT

Before you decide on *any* cleaning equipment, investigate the Magnus Methods designed for difficult cleaning.

MAGNUS CHEMICAL CO., INC.
208 South Ave., Garwood, N. J.
In Canada: Magnus Chemicals, Ltd., Montreal
Service Representatives in Principal Cities

magnus

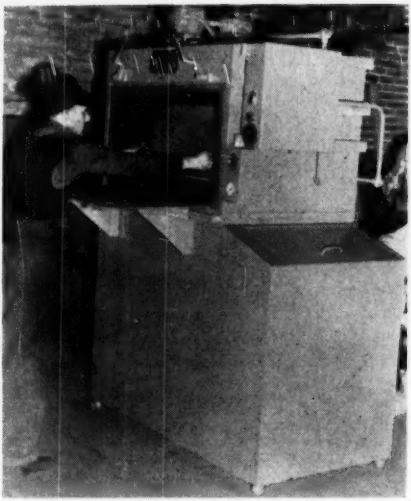
uniformity in the flaked frit produced by this process makes possible higher production in the shops and fewer rejects in the finished product. The "1700" frit also has the proper coefficient of thermal expansion required for use in such applications as ranges, laundry equipment, refrigerators, and other appliances.

For further data circle No. 17 on Reader Service Card inside back cover.

Drum Cabinet Washing Machine

A washing machine to process steel stampings and machine products has been designed and manufactured by the Industrial Washing Machine Corp., Matawan, N. J.

Designated "Drum Cabinet Model 30 X 20," the machine is extremely compact, being only 4 feet 6 inches long, 4 feet wide and 7 feet high. It is heated by gas, but can be designed for steam heat.



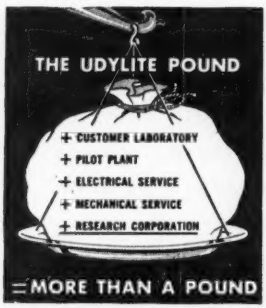
Drum Cabinet Washing Machine

A combination model, the machine has a tumbling mesh drum for small stampings and a rocking cradle that will hold baskets of machined parts. They may be used alternately.

The operator places either the drum or baskets containing work to be cleaned in the machine and closes the door. He turns the timer to the desired spray time and the pump starts spraying detergents at high pressure. While the spray is in operation the drum rotates, tumbling the work and exposing all areas to the detergent. When the baskets are used they are rocked back and forth with the same result. After the wash has been completed, a clear spray rinses off the detergent.

Paul E. Wintergrass, methods engineer for Aircraft-Marine Products, Inc., reports that the Drum Cabinet

Would you like to get extras for the dollars you spend?



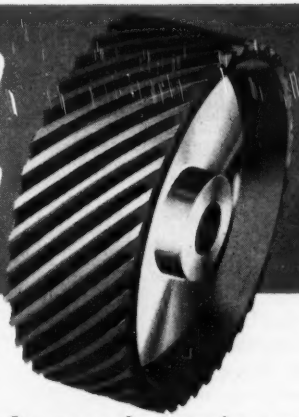
If you would, buy Udylite plating supplies. As a Udylite customer, you get quality plating products with pluses profitable for you.

The Udylite Customer Service Laboratory is at your service to assist in finding the best materials for processing your products. Our Pilot Plant will find the most economical method of obtaining the finish you desire. And our Mechanical and Electrical Service specialists are always available for on-site testing and servicing of any equipment in your plant.

Combined with the superior plating products developed by the Udylite Research Corporation, these extra services insure perfection results at lowest cost. For a pound that's more than a pound, *Buy Wisely—Buy Udylite Supplies.*

THE Udylite CORP. • DETROIT 11, MICH.

CUTS COSTS like Magic!



Chicago Rubber Company's amazing new R54 contact wheel cuts better—faster—longer and will substantially reduce your grinding and polishing costs 3 ways.

This precision machined and accurately balanced wheel is easily and quickly knocked down and reassembled for tire replacement or change.

- Replace only the rubber tire when necessary instead of the entire wheel.
- Choose from a complete assortment of tire treads for different grinding operations, still using the same wheel.
- And as usual Chicago Rubber Company's R54 contact wheel allows you to get the most wear from your abrasive belt—more than you ever got before.

There is a replaceable rubber tire with proper tread for every grinding requirement and in a wide variety of durometer ratings. Write for descriptive literature.

CHICAGO RUBBER COMPANY, INC.

Main Office & Factory
2620 N. Clybourn Ave. Chicago
Makers of the COSMOWHEEL

"IT'S THE WHEEL THAT DOES THE WORK"

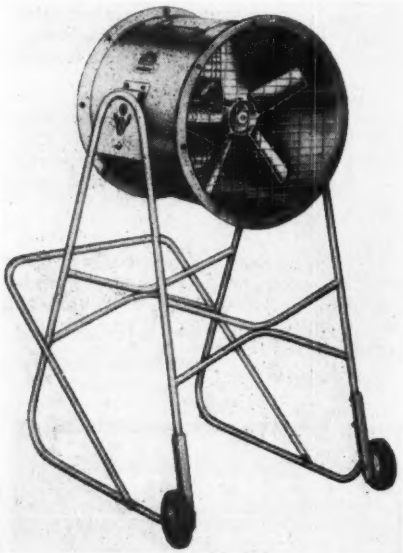
Washing Machine installed there is doing far more work in much less time than was previously possible, and that the quality of the work is greatly improved.

For further data circle No. 18 on Reader Service Card inside back cover.

Portable Cooling Fan

A portable mancooler fan has been added to the line of M & E Manufacturing Company's direct drive fans. Application for this model is made for accelerating the air drying of many manufactured products, spot exhausting of steam, smoke and fumes created by temporary conditions, or cooling heated areas.

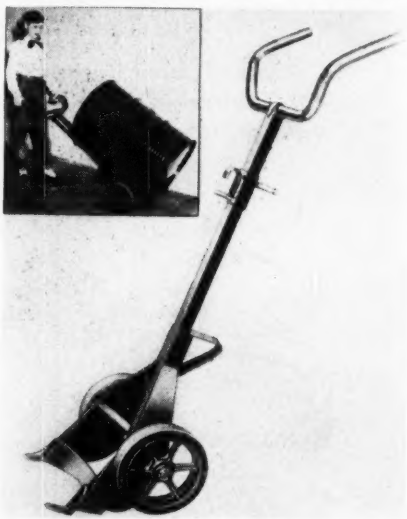
Units are available in diameter sizes of 24 to 48 inches, air capacities from 4360 to 32,400 cfm. Complete specification and performance data is described in the new Bulletin 500 available from M & E Manufacturing Company, Indianapolis 5, Ind. For data circle No. 19 on Reader Service Card inside back cover.



Portable Cooling Fan

Float Lode Drum and Barrel Truck

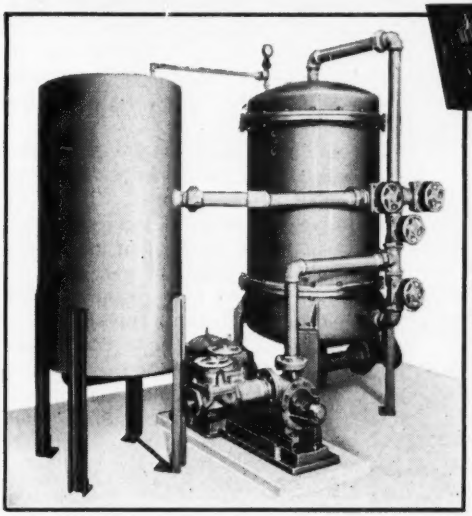
The Morse No. 150 Barrel Truck has been announced by the Morse Manufacturing Co., 762 W. Manlius St., E. Syracuse, N. Y. This truck is perfectly balanced, and a 1000 pound load can be held over the center of gravity by just one finger of the operator's hand.



Float Lode Drum and Barrel Truck

It accommodates containers from 24 to 45 inches long, and any diameter from 15 inches up. The truck picks up and deposits loads on pallets up to 8 inches high, and due to its 20-inch width, will easily move drums from tightly packed rows.

WAGNER BROTHERS FILTERS OFFER



DOUBLE ECONOMY

LOW OPERATING COST
LOW MAINTENANCE COST

Consider two factors before you specify filtering equipment:

1 The gallons of solution which can be efficiently filtered in a given period of time.

2 The cost of maintaining the filtering mechanism.

It's an established fact that Wagner Brothers Filters have a higher effective flow rate than any other equipment with *equal filtration area* . . . thus, gallon for gallon, it delivers *more* pure filtrate *per hour* at a lower unit cost. Sludge and other impurities (down to 1/10 micron) injurious to your plating quality are removed when the bath or solution is pumped through permanent membranes caked with a few cents worth of filter-aid (diatomaceous earth).

To clean, you simply turn a few valves and reverse the flow. Air bump backwash shocks the caked filter-aid from the membranes and through the sludge drain. Maintenance costs are reduced to ½ that of ordinary industrial filters since there is no messy replacement of bags, sheets or pads, no manual cleaning labor, no dismantling.

Standard models are available in capacities from 560 GPH up, filter areas from 3 to 100 square feet.

We design and build specials to suit your requirements. Write for detailed information and filtering questionnaire. If you're a plating equipment distributor, ask about territories open.

Your *primary* source for plating and polishing equipment and supplies.

Wagner **BROTHERS INC.**

432 MIDLAND AVE. • DETROIT 3, MICHIGAN

Chicago • Rochester • Cleveland • Cincinnati • St. Louis • Indianapolis • New York

The truck comes complete with solid rubber tired, roller bearing wheels, is built for endurance and service.

For further data circle No. 20 on Reader Service Card inside back cover.

Black Finish for Lubrication

The Mitchell-Bradford Chemical Co., 2441 Main St., Stratford, Conn., has announced the development of a process to provide a wear resistant low friction solid lubrication coating on parts subject to wear.

The process, designated as Black Magic plus Magic Mist, is a dipping process which coats the parts with a black finish which also provides lubricating properties. Among the products to which this process has been successfully applied are gages, dies, taps, drills, punches, reamers, typewriter parts, gears, spindles, instruments, springs, cutting tools, chucks, and guns.

For further data circle No. 21 on Reader Service Card inside back cover.

Spray Painting Masks

The need for greater efficiency in masking of electronic terminals during finishing operations is generally recognized.

To meet this demand, the By-Buk Company, industrial masking specialist, has developed a complete line of both re-usable and disposable masking caps for shielding all sizes and styles of hermetic seal terminals.

Special attention was given to the ease with which these cap-masks may be applied and removed. They fit down over the metal electrodes and cover the entire surface of the glass insulation, with sufficient grip to hold firmly in position and prevent paint from leaking in around the edges.

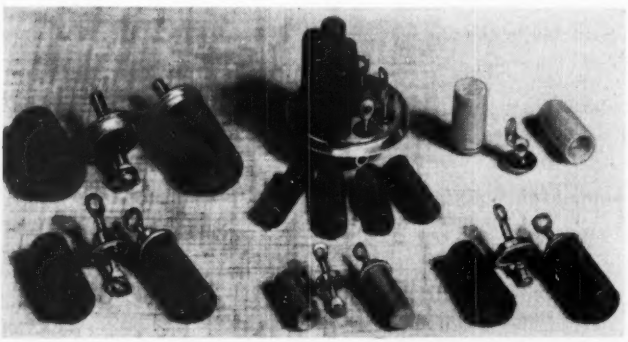
Paint will not adhere to the masks and can be peeled off when dry. They are practically indestructible and are made to withstand continuous production line usage. For large terminals special die-cut tape masks are produced in convenient rolls.

A line of inexpensive disposable terminal cap-masks made of balsa wood is also available. They have the same efficient masking characteristics as the rubbery plastic shields.

For masking hermetic seal group tape flange header panels, sturdy reusable brass, plastic, or rubber caps are available to cover the entire surface.

The By-Buk Company, 4314 West Pico Blvd., Los Angeles 19, California, will send a copy of their masking specialties catalog on request. They will also send free sample masks for terminals or mechanical components sent to them.

For further data circle No. 22 on Reader Service Card inside back cover.



Spray Painting Masks for Electronic Terminals

CLEANING SPECIALISTS

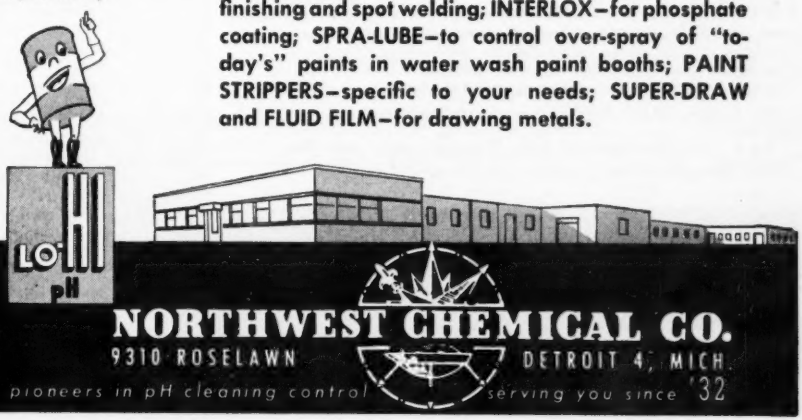
give you a "brighter" outlook on life.

Remember — YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

Northwest's production-tested chemicals and "Right-the-first-time" recommendations will save you money.

Northwest's Metal Cleaning Specialists can give YOUR products a "brighter" outlook, too.

From Northwest's years of research and experience in developing job-adjusted cleaners for your specific needs have come such processes as the LO-HI pH—for cleaning prior to plating, painting or vitreous enameling; ALKALUME—for preparing aluminum for finishing and spot welding; INTERLOX—for phosphate coating; SPRA-LUBE—to control over-spray of "today's" paints in water wash paint booths; PAINT STRIPPERS—specific to your needs; SUPER-DRAW and FLUID FILM—for drawing metals.



NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control *serving you since '32*

NEWS of the Industry

NEW PLANTS

A major expansion, the third within a four year period, is under way at the **PARKER RUST PROOF COMPANY** in Maywood, California.

Increased storage facilities for raw materials and finished products, a 20 per cent increase in manufacturing capacity, and added operating efficiency and safety for employees will result when the project is completed.

Bonderite, Parco Compound and Parco Lubrite are produced at the Parker plant.

A recently completed expansion program has resulted in a 60 per cent increase in the plant manufacturing capacity of **SCHMIEG INDUSTRIES, INC.**, Detroit 34, Michigan, engineers and manufacturers of dust and fume control equipment, production and finishing systems, spray booths, industrial ovens, mechanical washers, and industrial sheet metal equipment and accessories.

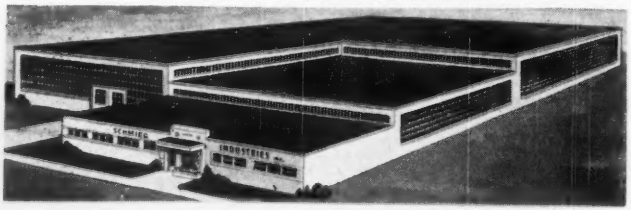
The announcement by Frank A. Schmieg, president, also stated that 1,000 square feet had been added to the engineering department.

Increased efficiency in the design and production facilities of the company will result from the changes, Mr. Schmieg pointed out.

The **PENNSYLVANIA SALT MANUFACTURING COMPANY** will add two new plants, George B. Beitzel, president, has announced. Both plants will serve as major components of the Chemical Specialties Division which is headed by Albert H. Clem, division president.

New plants will be constructed at Delaware, Ohio, and at Chicago Heights, Illinois. The buildings will be modern, one-story brick structures. These plants will serve as primary regional blending, packaging, warehousing and distribution centers.

The **ROTO-FINISH COMPANY**, Kalamazoo, Mich., has announced a new plant addition. The new building is 40 by 80 feet and will be devoted entirely to new machinery and equipment for



Enlarged plant of Schmieg Industries, Inc.

Yes, let's take the brush holders and rigging in this H-VW-M generator... they're fully insulated for longer life. Look, too, at the pigtail bar which eliminates current passage through springs and fingers. And the special copper graphite brushes—they give you optimum commutator efficiency. The molded "equaload" shunts distribute the brush load equally, minimizing selective action. And that's only the beginning...

All these exclusive improvements are the results of over eighty years of constant development...a continuing policy summed up in H-VW-M Platemanship—your working guarantee of the best that industry has to offer, not only in low-voltage generators, but in every phase of plating and polishing.

8336

PLATEMANSHIP

PLATEMANSHIP PLATING & POLISHING PROCESSES · EQUIPMENT · SUPPLIES

For technical information on low-voltage generators ask for Bulletin G-102.

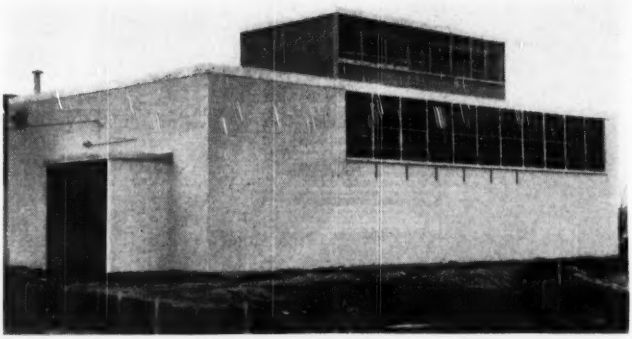
Your H-VW-M combination—of the most modern testing and development laboratory—of over 80 years experience in every phase of plating and polishing—of a complete equipment, process and supply line for every need.

HANSON-VAN WINKLE-MUNNING CO., MATAWAN, N. J.
PLANTS AT: MATAWAN, N. J. • ANDERSON, INDIANA
SALES OFFICES: ANDERSON • BALTIMORE • BOSTON • CHICAGO • CLEVELAND • DAYTON • DETROIT • GRAND RAPIDS • LOS ANGELES • LOUISVILLE • MATAWAN • MILWAUKEE • NEW YORK • PHILADELPHIA • PITTSBURGH • ROCHESTER • SPRINGFIELD (MASS.) • STRATFORD (CONN.) • UTICA • WALLINGFORD (CONN.)

H-VW-M

INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES

New Chip and Compound plant addition for The Roto-Finish Company.



manufacturing grinding chips and compound. These new manufacturing facilities will improve both the quality of the products and the facilities for handling orders.

COMPANIES

Harry T. Marks, administrative vice president of **FERRO CORPORATION,** has announced that **FERRO ENAMELS (PROPRIETARY) LTD.** (Ferro South Africa), a subsidiary of Ferro Corporation, will undertake construction of a frit-producing factory to be located in Brakpan, Transvaal, South Africa. W. Massey, formerly of Ferro-England, will be the new managing director of Ferro-South Africa.

Mr. Marks emphasized the increasing pace of industrialization in South Africa, which will produce a steadily increasing market for Ferro frit products in that country during the coming years. He further pointed to the profitable and successful operations by small Ferro subsidiaries and affiliates in eleven other countries, all of which have shown substantial gains during the past few years.

Edward W. McAleer, vice president of **FORMAX MFG. CORPORATION,** Detroit manufacturer of buffing wheels and buffing compounds, has announced the appointment of **WEAVER ENGINEERING AND SUPPLY CO., INC.,** Grand Prairie, Texas, as a distributor. A complete factory stock of Formax buffing compounds and Zippo buffing wheels will be warehoused at this location.

The president of Weaver Engineering and Supply Company, James E. Weaver, has a well-rounded background of experience in the metal finishing field. He established a plating supply business at Houston, Texas, four years ago and, while a warehouse is now maintained there, his main operation was moved to Grand Prairie, Texas, in 1953 with the acquisition of larger facilities.

The four-year scholarship awarded annually by George B. Beitzel, president of the **PENNSYLVANIA SALT MANUFACTURING COMPANY,** to the son or daughter of a company employee, was won this year by Charles E. Troy, son of Mr. and Mrs. Ernest E. Troy of Tacoma, Washington.

Mr. Troy is employed in the Caustic Department of the Tacoma plant of the Pennsylvania Salt Manufacturing Company of Washington. Charles attended Lincoln High School where he stood first in a class of 579 students. He was also active in extra curricular organizations and excelled in music. Aspiring to become a music critic, he plans to attend the University of Southern California.

Selection of this year's recipient was made by Dr. Louis P. Hoyer, superintendent, Philadelphia Public Schools and Vice President Gene D. Gisburne of the University of Pennsylvania, on the basic of scholastic record and College Entrance Board scores.

Robert L. Giesel, president, **ADOLPH PLATING, INC.,** Chicago, has announced the acquisition of the assets of **Advance Tinning Company,** also of Chicago.

The firm will continue its hot-dip tinning operations under Mr. Giesel's management without change of personnel or facilities. Carl F. Hansen, formerly president of Advance Tinning, will continue to be associated with the company as technical consultant.

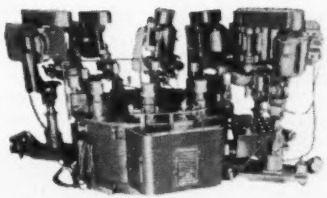
Mr. Giesel is vice chairman of the Chicago Electro-Platers Institute, and chairman of that group's Industrial Relations Committee. Mr. Hansen is a

Q: HOW TO INCREASE P-B* OPERATIONS and REDUCE COSTS!

A: with **PACKER-MATICS,** of course!

Whatever your finishing requirements—buffing, polishing or deburring, regardless of shape, size or metal—Packer-Matics can do it faster, economically and with greater uniformity than hand operation. Our engineering department will be glad to show you how Packer-Matic rotary, indexing and straight-line equipment can increase your profits.

Polishing and Buffing



No. 13-10 ROTARY INDEXING

PACKER-MATIC

AUTOMATIC MACHINES FOR BUFFING • POLISHING • DEBURRING

THE PACKER MACHINE COMPANY • MERIDEN, CONN.

former chairman of the Institute and is currently a member of its Board of directors, and is secretary-treasurer of the National Federation of Metal Finishers.

Horace H. Wagner, director of sales for the **CORONA MANUFACTURING CORPORATION,** Glendale, California, infra-red industrial oven manufacturer, will now expand sales efforts to cover the United States and its territorial possessions. Under agreement negotiated with Merco Industries, Seattle, Washington, Corona Manufacturing Corporation will have exclusive license under their patent for the Merco Infra "Pyrex" tube heater in the industrial oven field. This extends for the life of the patent and renewals thereafter.

Corona Manufacturing Corporation, relatively new (3 years) in the industrial infra-red oven business, has accomplished and introduced many firsts in the field. President of Corona Manufacturing Corporation is J. E. Blaine, former executive director of procurement for Lockheed Aircraft Corporation.

John D. Tebben, vice president, **WAGNER BROTHERS, INC.,** Detroit manufacturer of electroplating equipment and supplies, has announced the appointment of the **REYNOLDS-ROBSON SUPPLY COMPANY,** 2213-21 W. Glenwood Ave., Philadelphia 32, Pennsylvania, as a distributor for Wagner products.

Reynolds-Robson's sales force will actively promote the sales of Wagner Brothers' products within a territory comprising eastern Pennsylvania, southern New Jersey, Delaware, Maryland, Virginia, District of Columbia, North Carolina, South Carolina, eastern Georgia and Florida.

PEMCO CORPORATION, 5601 Eastern Ave., Baltimore 24, Md., is ready to offer advice and guidance to companies wishing to enter the field of porcelain enameling on aluminum. The Baltimore frit manufacturer has been working closely with DuPont and Alcoa in the development of this new material.

Pemco signed a license agreement with DuPont to manufacture the frits developed by the Wilmington firm. This was announced to Pemco customers, steel enameling companies, who were interested in expanding their facilities to include the enameling of aluminum. It became apparent in the early stages of this development that the porcelain enameling of steel, while closely allied in procedure to that of aluminum, could not be carried on with the same facilities at the same time. The firing temperatures of the two metals differ materially, and the composition of the frits used have an adverse effect one on the other.

Several steel enameling companies have started construction of separate facilities for the enameling of aluminum.

In order to assist these companies Pemco has printed a handbook, Technical Bulletin No. 2001, on the "Application of Porcelain Enamels on Aluminum Alloys." This is a step-by-step account of the procedures to be taken from the selection of the aluminum alloys through the application of the enamel and the correction of enamel defects.

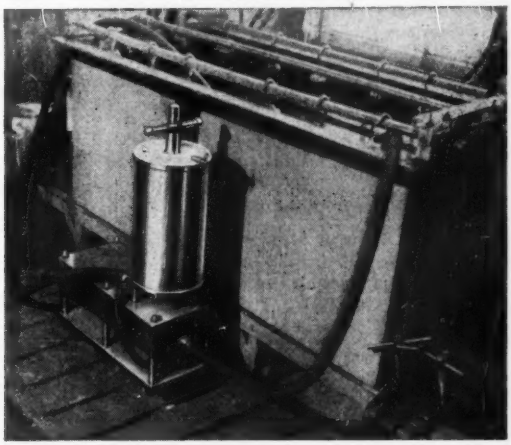
Pemco has also printed a bulletin that describes in detail the pre-treating and processes so vital to the bond of porcelain enamels on aluminum.

For those companies who express an interest in entering the field of porcelain enameling on aluminum, Pemco will furnish a four-page folder on the properties of the new material and the possible uses to which it might be put. This folder covers briefly the specific aluminum alloys indicated and the points to be considered in designing parts to be enameled. The pamphlet also describes the equipment and processing involved. In

Reynolds-Robson Supply Company

Here's how to cut your losses

get better finished plated work — save time and labor



The *"Sealed-Disc"* Filter will remove all dirt, dust, and sludge from your plating solutions. You will no longer worry about pitting, spotting, poor adhesion, formation of nodules, etc.

More and more platers testify to the remarkable savings in operating time and labor that the *"Sealed-Disc"* Filter gives them. These cost-minded platers get better finished plated work and have found that their solutions last l o n g e r. *"Sealed-Disc"* Filters, designed to meet plating room requirements, are smaller, more compact and portable, than ordinary conventional filters.

Regardless of the size or type of your installation, there's a *"Sealed-Disc"* Filter to "fit your job". You can depend on a *"Sealed-Disc"* Filter for positive, trouble-free performance that's proof against even the invisible impurities that cause nodules and porousness, proof against losses caused by rejects and reworking. Write for complete details or contact your regular plating supplier.

ALSOP

ENGINEERING CORPORATION

Filters · Filter Discs & Sheets · Mixers · Agitators

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Other Alsop Plating Room Equipment

We manufacture a full line of Mixers and Agitators covering a complete range of sizes, for mixing, blending, and dissolving. Stainless Steel Mixing Tanks are also available in a wide range of capacities. For full details and illustrations write for your free catalog.

writing for this folder, specify Technical Bulletin No. 2000.

Beyond the publication of these technical bulletins (more are in work), Pemco is in a position to advise interested parties in the selection of enameling equipment. The engineering and research facilities of this pioneer frit manufacturer will be at the disposal of companies who enter this new field.

The demand for porcelain enameled aluminum will probably begin with the architectural field. Aluminum as a building material has made rapid strides in the last decade. Its light weight, strength, its ease of fabrication, and its resistance to rust and corrosion has made it increasingly popular for this use. However, it lacks the variation of color that architects want. Porcelain enameled aluminum, on the other hand, provides an infinite variety of color and surface texture. In no other way, so far discovered, can aluminum acquire a finish with the permanence of this inorganic coating fused to it at high temperatures.

Many other uses for porcelain enameled aluminum will undoubtedly follow in the industrial and household appliance fields. However, for the time being, this material will not be recommended for kitchen utensils.

NEW POSITIONS

Quentin S. Stump

QUENTIN S. STUMP has been appointed national sales manager for Lord Chemical Corporation, York, Pa. Lord Chemical Corporation manufactures chemical compounds, tumbling barrels and media for all precision barrel finishing.

Mr. Stump began his sales career in 1937. He became president of his own company, the Hill Electroplating Company, York, in charge of management and sales. During his stay with Hill Electroplating Company, he spent two years study-

Key personnel and general sales staff present at the recent annual sales meeting of the **Tousey Varnish Company** meeting. C. R. Heagstedt, vice president, announced new laboratory facilities and additional technical personnel as part of a program of sales expansion. The present program is designed to further diversify the products supplied by the Tousey Varnish Company in the Industrial Finish Field.

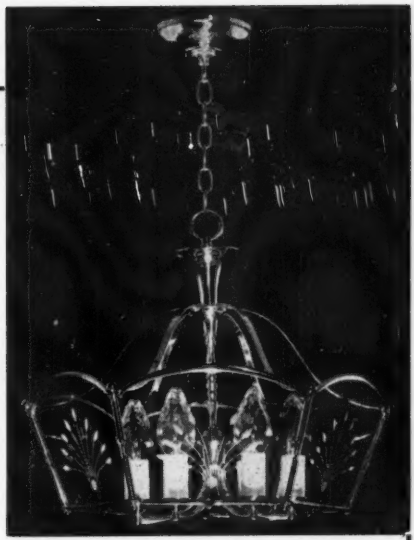
NIKOLAS

SINCE 1890

Quality Finishes

FOR THE

LIGHTING and LAMP INDUSTRY



Fixture Illustration Courtesy H. A. Framburg & Co.

- *CLEAR METAL AND WOOD LACQUERS*
- *LACQUER ENAMELS*
- *SYNTHETIC COATINGS*

BAKED OR AIRDRY—
CLEAR, TRANSPARENT COLORS OR ENAMELS

- *NOVELTY FINISHES*

Eye Appeal Sells Your Product!

Why jeopardize your reputation with inferior finishes when the finest cost no more?

FOR INFORMATION, SAMPLES AND RECOMMENDATIONS WRITE—WIRE—OR CALL

G. J. NIKOLAS & CO., INC.

2880 WASHINGTON BLVD., BELLWOOD, ILL. • 33 GRAND ST., BROOKLYN 11, N. Y.

ing metal finishing processes and development.

Mr. Stump joined Lord Chemical in 1952 as a sales engineer and has been promoted to national sales manager.

R. P. Ganchan

Elected recently to a vice-presidency of Automotive Rubber Company, Inc., was **R. P. GANCHAN.** This announcement was made by Tim G. Meulenberg, president, and R. L. Redmond, vice president, of ARco.

In addition to his new office with the ARco parent company, Mr. Ganchan is the general manager of ARco Rubber Processors, Houston, Texas. He has held this post since 1951. The latter firm is a division of Automotive Rubber Company, Inc.

ARco Rubber Processors, the Automotive Rubber Company Division which Mr. Ganchan heads, fabricates and rubber insulates processing tanks, pressure vessels, tank cars, exhaust systems, fume stacks, tanks, pipe, and so on, for the chemical, automotive, aircraft, electroplating, and other industries.

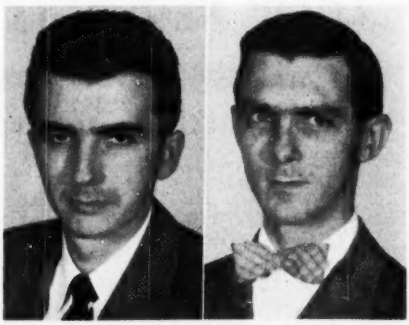
As an ARco vice president, Mr. Ganchan will now take part in Automotive Rubber Company's top echelon affairs related to ARco installations in Houston, Texas; Detroit and Kalamazoo, Michigan. The Detroit facilities house ARco general offices, laboratories, and tank lining plant. Detroit activities are concerned with tailoring and bonding of rubber sheeting to tanks, pipe, and fittings as a protection against acids, alkalies, and other corrosive elements found in the chemical, steel, electroplating, and other industries.

DR. HARRY WALKER has been appointed vice president of the Norma-Hoffmann Bearings Corporation, Stamford, Connecticut, in charge of the newly formed Walker Division which engages in the manufacture and sale of selenium and other types of dry disc rectifiers. It is planned to manufacture other types of electrical equipment also.

The Walker Division is located at the Stamford plant of the parent company. A complete line of optimum ripple, economical rectifiers is offered. To assure the utmost in dependability all models are designed for twenty years of useful life when operated in accordance with the manufacturer's instructions.

Solventol Chemical Products, Inc., Detroit, has announced the promotion of **JULIUS R. BELLEW** to manufacturing manager of the Metal Cleaning Equipment Division; and **IVAN ROSS** to special engineering consultant for the same division. Both men will have headquarters at the company's home office in Detroit.

According to Howard B. Downs, vice president and general manager, these appointments are part of an overall expansion program in the Industrial Division.



Ivan Ross (left), Julius R. Bellew

Mr. Bellew has been with the Solventol Company for 10 years, and has had extensive experience in both the engineering and estimating departments. He is an engineering graduate of the University of Detroit, and studied electronics at the Massachusetts Institute of Technology.

Mr. Ross joined the Solventol engineering staff three years ago, after receiving his Engineering Degree from Stanford University. In his new position, he will assist the Solventol industrial sales organization in an advisory capacity, and will be available for customer engineering field service.

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NU-TEX

DEPRESSED CENTER

DISK WHEELS

FOR FASTER, SMOOTHER CUTTING, roughing and grinding. Special, built-in resiliency provides smooth, cushioned cutting action . . . reduces bouncing . . . holds wheel in close contact with work. Cushioned action distributes pressure evenly . . . makes every inch of surface travel an inch of productive cutting . . . speeds up work with either portable or bench-type grinders.

FOR LONGER LIFE . . . LOWER COSTS. Bonded together with an extremely tough resin for added durability. Textile reinforcement provides maximum on-the-job safety . . . extra protection against breakage . . . longer life under continuous operation.

FOR A WIDE SELECTION . . . PROMPT SERVICE. Nu-Tex Depressed Center and Straight Disk Wheels are now available in popular diameters and thicknesses for all types of finishing. Grades range from 0 (hard) to 6 (soft). Write now for descriptive literature. Or, if you prefer, have an Atlantic Abrasive Engineer show you Nu-Tex Disk Wheels in action — saving time and money *on the job!*

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Carl C. Clabaugh

CARL C. CLABAUGH of the Metal Cleaner Department of Cowles Chemical Company, Cleveland, has been promoted to the newly-created position of sales manager of that department, Earl F. Clark, manager of the department has announced.

Mr. Clabaugh, who has been associated with Cowles for 2½ years, has been assistant manager of the Metal Cleaner Department for the past year. The newly designated position will give him full authority, in the field, to make decisions dealing with Metal Cleaner Department personnel and policies.

After attending Michigan State College, Mr. Clabaugh served as a chemist for a large electrical products company and was a technical sales representative for a chemical manufacturer before joining Cowles early in 1952.

Allied Research Products, Incorporated, manufacturer of the Iridite line of chromate conversion coatings for nonferrous metals and ARP Plating Chemicals, has announced the appointment of **PHILLIP BORELL** as its representative in the eastern Pennsylvania and adjacent New Jersey area. Mr. Borell will make his headquarters at Room 1123, Western Saving Fund Building, Broad and Chestnut Streets, Philadelphia, Pa. **DEAN WARD** continues to handle the major New Jersey territory. Both report to the Baltimore home office.

J. A. CAIRNS has moved to the home office of the corporation to handle special project sales.

Appointment of **A. I. PRUETT** as divisional manager, Newark, N. J., paint factory, and of **WILLIAM J. TIMBERMAN, JR.**, as divisional manager, Thresher paint and varnish division, Dayton, Ohio, has been made by E. D. Peck, vice-president in charge of Pittsburgh Plate Glass Company's paint and brush division.

A native of Pittsburgh, Pennsylvania, Mr. Pruett previously served for six years as divisional manager of the Thresher paint and varnish division. A graduate of Penn State College, he has been associated with Pittsburgh Plate Glass since 1947. As manager of the Newark paint plant, he succeeds A. B. Bingham, who retired in the interests of his health after heading operations at Newark since 1943.

Mr. Timberman, who joined the company in 1940 at the Newark paint plant in industrial sales, has directed aircraft and marine sales for the paint division since 1944. A native of Woodridge, New Jersey, he attended Stevens Institute of Technology.

A. L. Bashe

A shift in sales personnel has been made by G. S. Blakeslee & Co., in a move to render better and more adequate coverage. **A. L. BASHE** has been made sales manager to replace **JACK ARNOLD** who is now promoted to chief of the engineering department and new development section.

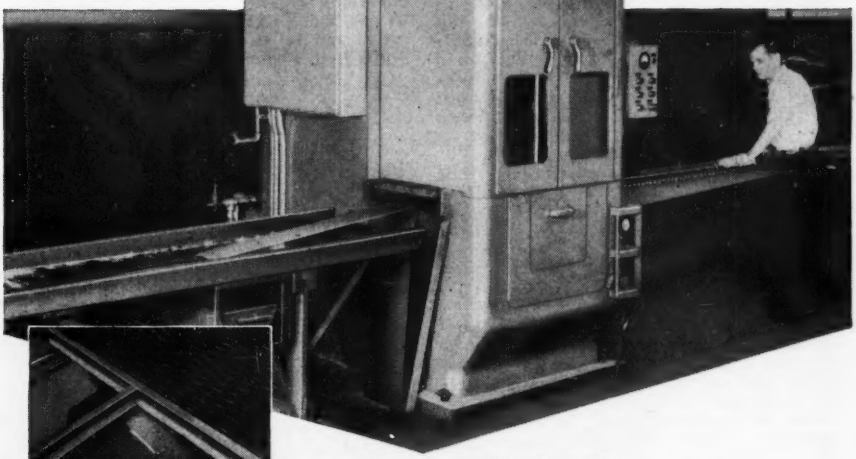
Mr. Bashe is 38 years old and joined the company in April of 1943. He was formerly a district supervisor covering parts of Michigan, Ohio, Indiana and Kentucky. His personal experience with the usual problems of salesman and customers plus his vast knowledge of metal degreasing and cleaning applications helps to make him ideally suited to the position of sales manager.

He will work out of the Chicago office but over 80 per cent of his time will be spent in the field working directly with salesmen.

Jack Arnold, new head of the engineering department and new development section, is 43 years old and has been working for G. S. Blakeslee & Co. for 14 years. He has proved himself an adept engineer as well as an authority on metal degreasing and cleaning applications.

MURRAY WAY

MICRO-POLISH strip grinding boosts output over 600 percent for Michigan manufacturer



The New Murray-Way rotary filter which efficiently reclaims coolant on this operation. Permanent filtering media saves the cost of this equipment in a short time.

★ **Assures Product Uniformity**
★ **Cuts Material Loss and Scrap**
★ **Eliminates Down-time**
★ **Replaces Two Expensive Hand Operations**
★ **Facilitates Subsequent Operations**
★ **Improves Product Appearance**
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★ **Pays For Itself**

Murray-Way's Automatic Equipment, thorough experience and expert engineering can save YOU money on YOUR polishing, buffing, grinding or filtering operations. Why not give us a call . . . JOrdan 4-6890 Detroit, or write for our complete, illustrated Micro-Polish Brochure.

MURRAY WAY

MURRAY-WAY CORPORATION

P. O. BOX 180, MAPLE ROAD EAST • BIRMINGHAM, MICH.

Polishing, Buffing, Grinding, Filtering Equipment that automatically cuts your costs.

Hugh V. McGuire

Plans have been announced by Hanson-Van Winkle-Munning Co., manufacturer of electroplating and polishing equipment and supplies, for the consolidation and expansion of its engineering and installation sales activities. In the future, sales engineering in this field will be handled directly out of the Matawan office and by a staff of specially trained engineers.

H-VW-M concurrently announced the appointment of **HUGH V. McGUIRE** to head the new group. He will be in charge of all sales engineering relating to engineering and installation activities.

Mr. McGuire returns to H-VW-M after a year of intensive experience in the metal finishing equipment field. Previously he was with H-VW-M for 13 years. He was a general equipment sales engineer and specialized in metal finishing plant layout.

His background with H-VW-M also includes experience in the export field and with graphic arts installations.

He is a graduate of Rutgers University and has undertaken subsequent studies relating to his work in the engineering and installation of metal finishing equipment.

Albert H. Clem, president of the Chemical Specialties Division of the Pennsylvania Salt Manufacturing Company, has announced the appointment of key personnel. All appointees to the staff of the new operating division are experienced Pennsalt executives who served previously in similar capacities within the consolidated company.

PAUL C. HURLEY, manager of advertising, will be responsible for advertising, sales promotion and market research. In addition, he will continue to direct the advertising activities of the Industrial Chemicals Division and Sharples Chemicals Inc.

E. S. GARVERICH will serve as technical director in charge of technical service and product development.

RICHARD O. WHITE, formerly superintendent of Pennsalt's Montgomery, Alabama, plant, has been named production manager, in which capacity he will direct the manufacturing activities of the new division.

There will be no changes in the sales management staff. Product department sales managers who will continue in present positions are: **S. H. CROUNSE,** B-K Department; **J. J. DUFFY,** Metal Processing chemicals; **H. A. FLETCHER,** Household Products; **J. S. HALL,** Laundry & Dry Cleaning Department; **H. F. McINTYRE,** Maintenance Chemicals; and **R. R. PIERCE,** Corrosion Engineering Products.

The appointment of **RAY F. BORST** as a sales and service representative for the Whitfield Chemical Company, Detroit, Michigan, has been announced by C. Whitfield Smith, president. His territory includes parts of Illinois, Wisconsin and Indiana, with headquarters in Chicago.

Arthur P. Schulze

Diamond Alkali Company, Cleveland, Ohio, has announced the appointment of **ARTHUR P. SCHULZE** as manager of public relations and advertising.

Under the supervision of a company executive, he will be responsible for directing and coordinating Diamond's public relations and industrial advertising programs, working in cooperation with the company's public relations counsel, Hill and Knowlton, and its advertising agency, Fuller and Smith and Ross.

A Clevelander, Mr. Schulze is a journalism graduate of the University of Missouri, and at one time was a reporter on the Elyria (O.) Chronicle-Telegram. An active member of the Public Relations Society of America, Sigma Delta Chi, and the International Council of Industrial Editors, he also has contributed articles to PRODUCTS FINISHING and other national industrial magazines during the past 10 years.

Gleaming

Beauty — in products as in people — is sometimes a special "glow" that seems to come from within, to cast its radiance upon all who see. And such is the beauty of a truly fine product, built to exacting standards and finished with a coating created for that product alone. Manufacturers wisely seek that beauty for their own quality merchandise, by turning to specialists for help. Within our laboratory, a complete staff of experts is constantly at work developing individualized finishes for a wide variety of manufactured ite... invite you to submit samples of your own products for recommendation.

Research, Quality, Service

ROCKFORD VARNISH *Company*
ROCKFORD ILLINOIS
Manufacturers of Protective and Decorative Coatings

Affiliate
GORDON BARTELS CO.
Roller Coating Specialists

Interchemical Corporation has announced the establishment of a Product Application Engineering Department. The unit will be headed by **F. L. WURZBURG, JR.**, assisted by **WILLIS E. LeCLAIR**, and will report to Norman S. Cassel, vice president for research and development.

The new department will deal with the problems posed by the inter-re'ationship of chemistry and mechanics in the application of the chemical coatings produced by Interchemical. These products are printing inks, industrial finishes, textile colors and others, most of which are applied by mechanical means such as printing presses, coating machines, sprays, dip tanks, dye-jigs and others.

Willis E. LeClair (left), F. L. Wurzburg, Jr.

The responsibilities of the new unit will include:

1. Providing the central Research Laboratories and the divisional development laboratories with information and assistance in projects where problems of mechanical application or control are involved.
2. Assisting the operating divisions in the sale of their products (particularly new developments) where mechanical problems are involved.
3. Informing research units about new developments in control instruments and application equipment.
4. Working with outside sources to develop instruments or equipment needed for the most advantageous use of the chemical coatings produced by Interchemical.

Mr. Wurzburg has been with Interchemical since 1933 and is widely known in the graphic arts industries as an authority on the reproduction and control of color. He is a graduate of Yale University.

Mr. LeClair joined Interchemical in 1935 and has been closely associated in an engineering capacity with research and development in the application of chemical coatings.

Ray Hermanson, vice president in charge of sales for Merit Products, Inc., Culver City, California, has announced the appointment of three new sales representatives for Sand-O-Flex contour sanders and Grind-O-Flex flexible grinding wheels.

NORMAN DAHLEY, with offices at 329 South Wood Street, Chicago, will represent the line in Illinois and Wisconsin. **THE HERREN-SIMS COMPANY**, 1601 St. Clair Avenue, Cleveland, will represent Merit Products, Inc., in Ohio and West Virginia. In the state of New York, **W. J. HOLTMEIER COMPANY**, 71 West 23rd Street, New York City, will represent Grind-O-Flex.

A. H. CLEM, president of the Chemical Specialties Division of the Pennsylvania Salt Manufacturing Company, has announced that **ALFRED H. POPE**, formerly a member of the Technical Department staff, has been named product supervisor for Pennsalt's metal cleaners and will be replaced by **WILLIAM T. WEST** of the Metal Processing Department's sales organization.

In his new position Mr. Pope will be responsible for the company's sales and service activities in the metal cleaners industry, in which field he has had extensive experience. Mr. Pope is an alumnus of Pratt Institute where he majored in chemical engineering. He joined Pennsalt in 1943 as a member of its Research & Development staff.

Mr. West has been associated with the company as sales representative for the New York area since 1951, and like his predecessor, is well known in the metal finishing field. As a member of the Technical Department staff he will be concerned with field work and liaison with the Research & Development Laboratories, manufacturing clients, and sales staff.

HERSCHEL E. POST, one of the nation's top authorities on industrial finishes, has been appointed general man-

ager of the Pacific Coast Paint Division of the Pittsburgh Plate Glass Company, it was announced by E. D. Peck, vice president in charge of the paint and brush division.

Associated with the paint industry for more than 30 years, Mr. Post joined Pittsburgh Plate Glass in 1930 as manager of the Sacramento, California, store after operating his own paint business there for nine years. In 1932 he was named sales manager for the Oakland, California, district and eight years later was appointed factory manager of the Houston, Texas, paint division. Since 1942 he has been general sales manager, industrial finishes.

Mr. Post is a member of the National Industrial Product Finishes Division Steering Committee of the National Paint, Varnish and Lacquer Association and the Association's Industrial Product Finishes Advisory Board.

Universal Midwest, Inc., of Chicago, agent for the Pennsylvania Salt Mfg. Co., recently announced the addition to the staff of **WALTER F. HESS.**

A mechanical engineer, Mr. Hess will handle sales of Pennsalt's line of chemical resistant cements, chemical resistant interliners, and chemical resistant coatings. With headquarters in Detroit, his territory will cover eastern Michigan, western Ohio and Kentucky.

Sarco Company, Inc., recently established a Northern California sales office at 35 Elmira St., San Francisco, Calif.

J. S. SPEAR has been named sales manager of the new branch office. Mr. Spear, who has been associated with Sarco Co., Inc., for more than fifteen years, was formerly a sales engineer in the New York territory. A professional engineer, Mr. Spear is a member of the Society of Plastics Engineers and the American Society of Heating and Ventilating Engineers.

Andrew Brown Company, manufacturer of Brolite Finishes, has appointed **RICHARD M. LARRABEE** as field representative for its Maryland factory, with headquarters in New York City.

For three years prior to joining the Andrew Brown Company, Mr. Larrabee was West Coast manager for another finish manufacturer. Most of his work, however, has been in the East.

Andrew Brown Company manufactures Brolite Aviation Finishes, Brolite Industrial Finishes, Brolite Automotive Finishes, and Brolite Z-Spar Marine Finishes. Its factories are located in Los Angeles, California; Laurel, Maryland, and Irving, Texas.

NORMAN B. PILLING, director of the Bayonne Research Laboratory of The International Nickel Company, Inc., since 1939, has assumed new duties as assistant to the vice president-manager, of the company's Development and Research Division in New York, F. L. La Que, vice president and manager of the division, has announced.

DR. W. ANDREW WESLEY, assistant director since 1939, succeeds Mr. Pilling as head of the Laboratory, with the title of manager.

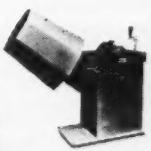
DR. JOHN T. EASH, metallurgical supervisor and head of the Ferrous Castings Section of the Laboratory, becomes assistant manager.

These executive changes are part of the recently announced intensification of the company's extensive product development and research program. Over the years this program has helped nickel achieve its present position in industry and it is being broadened in line with today's accelerated scientific and technological advances.

The Bayonne Laboratory, the com-

The New PLACO Tilting Type Tumbler

OPERATES IN ANY POSITION . . . ALL TUMBLE FINISHING OPERATIONS, WET OR DRY!



SEVEN BIG REASONS WHY PLACO IS THE MOST ADVANCED UNIT IN ENGINEERING, CONSTRUCTION AND OPERATION.

1. One hand control of all operations.
2. Rugged ½" steel fabricated design.
3. Ball bearings used throughout with ½ H.P. ball bearing motor.
4. Gear Box—Drive completely immersed in oil.
5. Operates in any position by just turning of spiral geared automatic locking device.
6. Furnished with either wood or steel large capacity octagon barrel, 18" mouth, 22" wide, 22" deep (rubber lined extra).
7. Direct gear driven—no belts—no pulley—no ratchet.

Inquiries Invited—Some Distributor Territories Available.

METAL FINISHING MFG. CORP.

89 NORTH 11TH STREET BROOKLYN 11, N. Y.

pany's largest research center in the United States, is one of three major research laboratories operated by International Nickel and its affiliates in this country, Canada and the United Kingdom. Inco also operates ten plant laboratories in the three countries and a marine corrosion laboratory near Wilmington, North Carolina.

The oldest of Inco's laboratories, Bayonne is well equipped to melt, process and study a wide variety of metals and alloys ranging from the precious metals through nickel to the ferrous metals. Much of the attention of the Laboratory's staff has been directed toward the products of Inco's customers. Extensive facilities are provided for physical and corrosion research, electroplating and the casting and working of metals.

It was at the Bayonne Research Laboratory that ductile cast iron, a cast material of great usefulness, was invented, developed and perfected in what many metallurgists believe is the most outstanding foundry development since the first American type of malleable iron was made in 1820.

TRAINING COURSES

The **BINKS MANUFACTURING COMPANY'S** free **SCHOOL OF SPRAY PAINTING** will begin its Fall schedule of courses on September 13 through September 17 at the company's Chicago plant.

The one-week course is open to all those who are interested in learning modern and proper methods of spray application, and the correct care and maintenance of spray equipment.

The courses will be repeated: October 4 through October 8, November 8 through November 12, December 6 through December 10.

The school is conducted in specially equipped classrooms. Attendance is limited to 25 so that personal attention can be given to individual problems. As much as possible, students with like backgrounds and problems are grouped together. First-hand experience in the construction and operation of spray equipment is supplemented with modern audio-visual training aids.

Class members become thoroughly familiar with spray guns by taking them apart, re-assembling and testing them. During their instruction the students actually produce defects commonly encountered in spray painting and then learn how to correct them. The operation of paint circulating systems, fluid handling pumps, oil and water extractors and catalyst painting equipment is also included in the curriculum.

The Binks' school is under the direction of William Beacham, a nationally known paint chemist and spray painting authority. His broad background in the paint field, and his experience as a writer of numerous technical articles are helpful to those who have questions about the proper application of specific finishes and coatings.

No previous experience in spray painting is necessary to attend the Binks School of Spray Painting. Instruction is of benefit to all who have anything to do with paint . . . from the beginner to the supervisor. It is also of value to those who supply industrial plants and coatings of all kinds.

There is no tuition charge for these courses.

Applications for enrollment should be made as far in advance as possible so that reservations for suitable hotel or other accommodations can be made. Address: E. F. Watts, Binks Manufacturing Company, 3118-40 Carroll Avenue, Chicago 12, Illinois.

William Beacham, director of the Binks School of Spray Painting, explains the theory of spray painting to a class in Binks' Chicago plant.

Two instructors in the **DEVILBISS COMPANY SCHOOL OF SPRAY PAINTING** estimate they have effected economies of millions of dollars for users of spray painting equipment during their teaching careers at the Toledo, Ohio, company which manufactures spray painting and allied equipment. From their years of experience they can cite hundreds of examples where the teaching and application of correct spray painting techniques have saved paint and lowered costs.

The spray painting course begins in the classroom where the tool (spray gun) is thoroughly explained. The theory sessions extend to the other equipment which a spray operator will use. Every item constituting a complete spray painting outfit is thoroughly covered. Air pressures, material viscosities, film thicknesses and all of the ramifications of painting are discussed. The pupils also are taught to assemble and disassemble equipment.

After the classroom work, the group is taken into the laboratory where everyone is given an opportunity to prepare materials and spray them. Each student is taught the use of the gun. The classroom theory is put into actual practice so that students can see for themselves the results which correct techniques produce.

Enrollment in the school is free, the only cost to the student being his board and room. Enrollment applications may be obtained from the DeVilbiss Company, 300 Phillips Avenue, Toledo 1, Ohio.

Here are the dates for courses of instruction in industrial spray finishing for the remainder of 1954 at the DeVilbiss Company School of Spray Finishing in Toledo: August 16, September 13, October 11, November 8, December 6.

MEETINGS

The **ANNUAL PICNIC** of the **BUFFALO BRANCH, A.E.S.**, will be held on August 14. Members of the Toronto and Rochester Branches have indicated their interest in joining with Buffalo in this social affair.

For information on details and reservations, contact Joe Ruff, 1492 Berg Road, Buffalo, New York.

E. J. Murphy, of Montgomery Paint Works, will head the 26 members of the Chicago Paint and Varnish Production Club who will handle the arrangements for the **32ND ANNUAL MEETING** of the **FEDERATION OF PAINT AND VARNISH PRODUCTION CLUBS**, to be held at the Palmer House, Chicago, Ill., November 18, 19 and 20, 1954.

Mr. Murphy will serve as general chairman of the Host Committee and will be assisted by the following subcommittees:

Annual Meeting of Japanese electroplaters held in Osaka, Japan, in February, 1954.
(Photo courtesy Toyukai, Osaka, Japan.)

Registration—Richard Gohman, Standard-Toch Chemicals, (chairman); R. R. Bruhn, Sherwin-Williams Co.; W. L. Hancock, Martin-Senour Co.; W. S. Houck, Glidden Co.; Ray V. Jablon, Illinois Paint Works; E. F. Jago, Great Lakes Paint & Varnish Co.; E. H. Miller, Midland Industrial Finishes; B. Orwig, Sherwin-Williams Co.; and H. E. Schade, Armstrong Paint & Varnish Works.

Banquet—C. M. Scholle, Jewel Paint & Varnish Co., (chairman); S. Danoff, Midland Industrial Finishes; and R. J. Gnaedinger, John A. Steen Varnish Co.

Entertainment — T. F. Byron, Armstrong Paint & Varnish Works, (chairman); W. C. Ashley, Pyroxylin Products, Inc.; and L. E. Ludwig, Sherwin-Williams Co.

Dance—C. F. Tilgner, Illinois Paint Works, (chairman); C. Kosek, Wilson & Co.; and D. T. Woods, Armstrong Paint & Varnish Works.

Floor—R. Mountsier, Illinois Paint Works, (chairman); A. Bohnert, Enterprise Paint Mfg. Co.; A. E. Counter, Barker Chemical Co.; T. L. Dahlberg, Jr., John A. Steen Varnish Co.; W. Fritsch, Enterprise Paint Mfg. Co.; Carl Lemcke, McWhorter Chemicals, Inc.; and G. R. Penn, Bradley-Vrooman Co.

The Host Committee works under the supervision of the Federation Meetings Committee which is led this year by Raymond C. Adams, of the Southern Club. Mr. Adams is assisted by W. C. Ashley, A. F. Bohnert, J. E. Creager, T. L. Dahlberg, and M. A. Glaser, of the Chicago Club; M. Bauman, of the New York Club; J. E. Hoffmeyer, of the Dallas Club, J. Scala, of the Northwestern Club; and D. D. Wyatt, of the Southern Club.

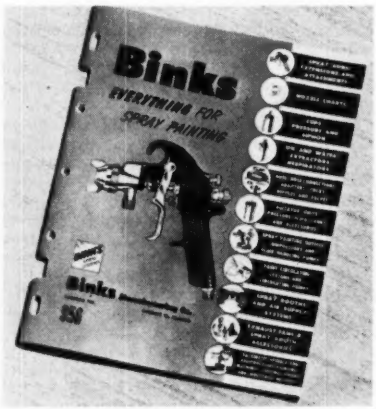
NEW BOOKS

The **Binks Manufacturing Company** has announced the publication of **CATALOG 956,** a 74 page book covering the complete line of Binks Spray Painting Equipment.

CATALOG 956 is new in every detail. The 1100 products and accessories have been classified into 11 sections for fast reference. These sections are shown on the front and back covers of the catalog and are keyed with the pages by a special thumb index which makes it easy to locate any product instantly without reference to the index.

Because of the importance of correct nozzle selection when applying modern finishes and coatings, the new **956 CATALOG** devotes 8 full pages to this subject. Easy-to-read tables show the correct fluid and air nozzles, air requirement and needle for each of a wide range of fluids, from standard paints to airplane dope, heavy materials and adhesives.

This catalog also provides detailed information on spray guns, extensions and attachments, pressure and siphon cups, oil and water extractors, pressure fluid tanks and accessories, hose, spray painting outfits, compressors, fluid handling pumps, paint circulating systems, spray booths, air supply and exhaust fans, automatic finishing equipment and a wide range of fittings and accessories.



A copy of the **956 CATALOG** will be mailed without charge to all bonafide users of spray painting equipment who ask for it on their company letterheads. Address your request to **Binks Manufacturing Company,** 3118-40 Carroll Avenue, Chicago 12, Illinois.

Flow and Fan — Principles of Moving Air Through Ducts, by C. Harold Berry. Published by The Industrial Press, 148 Lafayette St., New York 13, N. Y. 232 pages, 84 illustrations. $4.00.

The how and why of basic calculations in the design of systems for moving air or other gases are problems to which the author of "Flow and Fan," Professor C. Harold Berry, has brought both engineering and teaching experience.

The two major divisions of treatment are: (1) the flow of gas through duct

systems, and (2) fan performance and control. In the seven chapters on gas flow, basic data and methods for finding system resistance are presented; the final six chapters are devoted to selecting a fan for a given duty.

Flow and Fan was written to meet the needs of students interested in acquiring a working knowledge of ventilation and will be useful to practicing engineers as well. It is an outgrowth of a compilation of lecture notes developed for a course at Harvard, where the author is Gordon McKay Professor of Mechanical Engineering.

The arrangement of topics is especially suited to presentation of a rather complex subject to readers at various levels of preparation. Topics on which adequate information is difficult to find elsewhere are developed fully, while standard reference material is held to a minimum.

Subjects covered include: Factors in gas flow measurement, head, density, pressure, boiler draft, losses in laminar and turbulent flow through various shapes of duct, fan types and performance, fan selection and model testing.

Demand for information about zirconium has been so great that **The Carborundum Metals Company, Inc.**, Akron, N. Y., recently published a booklet **"FACTS ABOUT ZIRCONIUM"** for general distribution.

"FACTS ABOUT ZIRCONIUM" is a concise compilation of information about the history and production of zirconium. The mechanical and physical properties, chemical properties, facts about fabrication of zirconium such as melting, forging, rolling, welding, machinability are discussed. One chapter treats of zirconium chemicals such as zirconium tetrachloride, dioxide, sulphate and Carbo-Cast-Aid.

The appendix lists data on crystallographic features, and atomic and nuclear properties.

This factual pocket-sized booklet on zirconium is the result of collaboration between technical personnel in the Research Departments of both The Carborundum Metals Company, Inc., and The Carborundum Company.

PORCELAIN ENAMEL SPRAYING MANUAL. The Porcelain Enamel Institute has announced the publication of a manual on spraying which fulfills a long recognized need for additional practical and usable information on this subject.

The booklet **"SPRAYING PORCELAIN ENAMEL"** is the work of a special Sub-committee on Spraying appointed by the Porcelain Enamel Institute's active Process Development Committee. The Sub-committee was chairmanned by J. J. Baker of International Harvester Company and had as its members M. L. Pouilly, formerly of the DeVilbiss Company and now with Illinois Spray and Equipment Company, and R. D. Beck of Binks Manufacturing Company.

The booklet covers every phase of spraying porcelain enamel upon the base metal, from the development of the gun to the atomization, the effect of malpractices in spraying, and the performance of the equipment itself, including spray guns, tanks, hoses, compressed air systems, and pipeline feeding. The paper also covers the different methods of obtaining atomization, such as compressed air, steam, hydraulic pressure, electrostatic and centrifugal forces. The operating characteristics of both hand guns and automatic spray guns is covered also.

The spraying booklet is the first volume in a series of manuals on porcelain enamel processing methods to be published by the Institute. Available at $1.00 per copy, it may be obtained by writing the **Porcelain Enamel Institute, Inc.**, 1346 Connecticut Avenue, N. W., Washington 6, D. C.

meetings OF INTEREST TO FINISHERS

Aug. 14. Buffalo Branch, A.E.S., Annual Picnic. Contact Joe Ruff, Picnic Chairman, 1492 Berg Road, Buffalo, New York.

Sept. 8-10. Porcelain Enamel Institute, 16th Annual Shop Practice Forum, University of Illinois, Department of Ceramic Engineering, Urbana, Illinois.

Sept. 16-17. 1954 Semi-Annual Meeting, American Hot Dip Galvanizers Assn., Inc., Hotel Dennis, Atlantic City, N. J.

Nov. 18-20. Federation of Paint and Varnish Production Clubs, Annual Meeting, Palmer House, Chicago, Illinois.

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23. Esbec Catalog. A four-page catalog available from Tumbling Sales & Service Co., Greenwich, Conn., illustrates and describes the company's line of field engineered barrel finishing equipment and supplies.

24. Brulin Solvent Degreaser. Procedure 15-1, an illustrated general description of the Brulin solvent degreaser, including typical analysis and suggested uses, may be obtained from Brulin & Co., 2939 Columbia Ave., Indianapolis 7, Ind.

25. Why Hot Spray? A booklet listing the advantages of the use of hot spray is available from The Spee-Flo Co., 720 Polk Ave., Houston 2, Texas. Many questions regarding the use of hot spray are answered, including the use of the Spee-Flo Pressurematic paint heater and pump.

26. Grind-O-Flex Data Sheet. An illustrated data sheet which describes the advantages of multiple Grind-O-Flex wheels is available from the manufacturer, Merit Products, Inc., 4023 Irving Place, Culver City, Calif.

27. Planned Systems. Available from Peters-Dalton, Inc., 17908 Ryan Rd., Detroit 12, Mich., is a 12-page illustrated brochure describing the equipment manufactured by Peters-Dalton, and the integration of the various components into complete systems.

28. Alkalume Process Brochure. The Alkalume Process for preparing aluminum, magnesium, and hard-to-clean steels for welding and finishing operations is described in a 12-page brochure available from the Northwest Chemical Co., 9310 Roselawn, Detroit, Mich.

29. Vapor Spray Degreaser Bulletin. A bulletin describing the Metalwash improved-design Vapor Spray Degreaser is available from Metalwash Machinery Co., 915 North Ave., Elizabeth 4, N. J.

30. Plextone Bulletin. Technical Bulletin No. 520, outlining the characteristies of the Plextone finishes, and covering physical properties of these multicolored enamels, is available from Maas & Waldstein Co., 2119 McCarter Highway, Newark 4, N. J.

31. Filtration for Paint Spray Booth Water. Automatic skimming and filtration of water used in water wash spray booths is described in a catalog available from Industrial Filtration Co., Lebanon, Indiana.

32. Harshaw Chemicals for Industry and Laboratory. Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio, has available a 16-page booklet designed to give the reader an over-all picture of the company's line of products.

33. Nubelite Finishes. A 24-page booklet produced by The Glidden Co., Nubian Industrial Division, 1855 N. LeClaire Ave., Chicago 39, Ill., contains much factual and technical information regarding Nubelite finishes for refrigerators and home freezers.

34. Furnace Bulletin. Despatch Recirculating Heat Treating Furnaces are illustrated and described in Bulletin 81 available from the Despatch Oven Co., 619 S. E. 8th St., Minneapolis, Minnesota.

35. Barrel Finishing Brochure. The Abbott Method of barrel finishing and an improved tumbling barrel are fully described in a four-color brochure available from The Abbott Ball Co., 1084 New Britain Ave., Hartford 10, Conn.

36. "The Ransohoff Story." A 48-page brochure telling in word and picture "The Ransohoff Story" of pioneering and progress in the development of equipment for the surface treatment of metal products, is available from N. Ransohoff, Inc., North Fifth St. and Ford Blvd., Hamilton, Ohio.

37. Econocote Folder. Econocote for cleaning and phosphating is discussed in a folder available from Metasurf Corp., 12830 Eaton Ave., Detroit 27, Michigan. Typical Econocote uses and advantages are listed.

38. Koven Specialized Equipment. Bulletin No. 500, available from L. O. Koven & Brother, Inc., 154 Ogden Ave., Jersey City 7, N. J., illustrates and describes some of the specialized equipment designed and built by the company.

39. Sicon Silicone Coatings. A four-page brochure available from Midland Industrial Finishes Co., East Water St., Waukegan, Ill., cites case examples of Sicon applications on appliances, manifolds, heaters, jet engines, as shown by current Sicon advertising.

40. "Through History With Standards," published by American Standards Assn., 70 E. 45th St., New York 17, N. Y., contains short stories and cartoons illustrating the founding of many present day standards.

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41. Zinclate Chart. A comparison chart of the company's twelve Zinclate protective coatings, to help determine the type of coating best suited to a particular corrosion problem, is available from Industrial Metal Protectives, Inc., 406 Homestead Ave., Dayton 8, Ohio.

42. Purification of Chromic Acid Copper Stripping Solution. Available from Industrial Filter & Pump Mfg. Co., 5904 Ogden Ave., Chicago 50, Ill., is a four-page bulletin No. 224-B-454 on the ion-exchange system for purification of chromic acid copper stripping solution.

43. Impervite Immersion Heat Exchangers. Physical properties and chemical resistance of Impervite are listed and four impervious graphite immersion heat exchangers manufactured by the company are illustrated in Bulletin No. 753 available from Falls Industries, Inc., Aurora Rd., Solon, Ohio.

44. American Buffing and Processing Brochure. An illustrated brochure describing the company's facilities for high-volume production buffing, polishing and deburring is available from American Buffing and Processing Co., 525 W. 76th St., Chicago 20, Ill.

45. "Research at Alcoa." A 54-page booklet published by Aluminum Co. of America, 726 Alcoa Bldg., Pittsburgh 19, Pa., describes the work of Aluminum Research Laboratories and contains a 40-page bibliographic section in which are listed more than 1,000 books, technical papers, and articles on aluminum.

46. Globe Catalog. A catalog available from The Globe Chemical Co., Murray Rd. and Big Four R.R., Cincinnati 17, Ohio, contains information on chemicals and allied chemical specialties manufactured and sold by the company.

47. Clinton Selenium Rectifier. The Clinton Supply Co., Inc., 112 S. Clinton St., Chicago 6, Ill., has available Bulletin No. 4553-A which describes their line of selenium rectifiers.

48. Keystone Industrial Brushes. Catalog Price List K-54, available from Keystone Carbon Co., Industrial Brush Division, St. Marys, Pa., illustrates and describes the slip ring, motor and generator brushes, carbon and metal-graphite contacts, and porous bronze and porous iron bearings manufactured by the company.

49. Firestone Exon Vinyl Resins. A booklet available from the Chemical Sales Div., Firestone Plastics Co., Div. of the Firestone Tire & Rubber Co., P. O. Box 690, Pottstown, Pa., presents information on physical and chemical properties of Firestone Exon resins.

50. Catalog of High Vacuum Equipment. CVC's first catalog of equipment for the production, measurement, and utilization of high vacuum in industrial processes and laboratory applications, is available from Consolidated Vacuum Corp., 1775 Mt. Read Blvd., Rochester 3, New York.

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51. "BN—BD—BFR—BF Reinforced Resinoid Products." Catalog 1748, available from Norton Co., Worcester, Mass., contains typical application photographs, tables of wheel sizes, prices, and operating speeds for the company's line of reinforced resinoid grinding wheels.

52. For Dust-Free Finishes. Bond Chemical Products Co., 2639 Clybourn Ave., Chicago 14, Ill., has available a catalog sheet describing their tack cloth, available in rolls or in bulk.

53. NesTier Hopper Rack Bulletin HR-101. Available from The Chas. Wm. Doepke Mfg. Co., Inc., 8898 Blue Ash Rd., Rossmoyne, Ohio, is a bulletin which illustrates, describes and gives complete specifications on the NesTier Hopper Rack.

54. "Protective Coatings by Ceilcote." Catalog C-150, issued by The Ceilcote Co., 4848 Ridge Rd., Cleveland, Ohio, offers complete data on nine different coatings, including base formulation, temperature resistance, abrasion resistance, chemical properties, adhesion, method of application, surface preparation, and colors.

55. Paint Filtration. Catalog No. 054, issued by Cuno Engineering Corp., Meriden, Conn., describes filtration of industrial and automotive paint products for producer and user, discussing applications, advantages and characteristics of filtration equipment for enamels, solvents, lacquers, thinners, varnishes, and air.

56. Plant Maintenance Cleaning Guide. How-to-do-it charts based on actual in-plant maintenance procedures are featured in the Guide available from Oakite Products, Inc., 120 Rector St., New York 6, N. Y.

57. Depend on Davies. A catalog containing a partial roster of major plating and polishing equipment and materials supplied by Davies Supply & Mfg. Co., 4160 Meramec Ct., St. Louis 16, Mo., is available from the company.

58. "Vapor Degreasing Do's and Dont's" is the title of a manual showing proper degreaser operating methods available from Manufacturers Processing Co., 1354 Hilton Rd., Detroit 20, Mich. The Manpro Manual covers every phase of metal cleaning through vapor degreasing, including safety, personnel, correct layout and maintenance of equipment, efficient operations, drainage, machines, and chemicals.

59. Eezy-Stak Bulletin No. B-54. Wire & Iron Products Inc., 1719 Sixteenth St., Detroit 16, Mich., has available a bulletin on Eezy-Stak parts handling baskets, describing the firm's line of standard and custom-engineered baskets.

60. Plating Rectifier Bulletin No. 5500. An illustrated bulletin containing helpful hints on installations of plating rectifiers and describing different arrangements best suited for certain installations is available from Ther Electric & Machine Works, Dept. PFC, 17 S. Jefferson St., Chicago 6, Ill.

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